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VOLUME 126, No. 21 MAY 20, 1948

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CALENDAR OF COMING EVENTS

May 19, 20, 21, 1948—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Roosevelt Hotel, New Orleans, La.

June 11-12, 1948—Paper & Twine Association, Annual Convention, French Lick Springs, Indiana.

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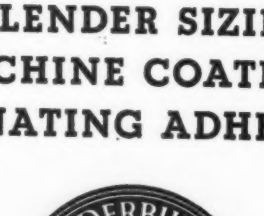

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Paper TRADE JOURNAL

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New Mill Is Started By Green Bay Company

GREEN BAY, Wis.—A $1,150,000 pulp and paper mill is being built here by a new company, the Green Bay Paper and Pulp Company. It will use a new pulp-making process, known as semi-chemical treatment. It is being erected on the east bank of the Fox river, just north of the Hoberg Paper Mills sulphite plant. Incorporators are present stockholders of the Green Bay Box Company, with George Kress president of both concerns.

Two primary products, corrugated board and liner board for shipping containers, will be made at the outset. The mill will use peeled aspen and rough jack pine wood to produce a liner board which is termed as strong, light and of much better appearance than the best competitive board. Cost will be lower.

The new company has agreed to make test runs of wood pulp for other paper producers in this area with a view of determining how semi-chemical pulp can be used in other paper products. It will be a pilot plant on a commercial scale for the use of the paper industry in the Fox river valley, according to present plans. The new concern was given the fullest cooperation from the others in the area.

Laboratory work on the semi-chemical process as applied to liner board was carried on by the United States Forest Products Laboratory at Madison, Wis.

"It is a laboratory where a small concern without research facilities can call upon the best technicians in the country, Mr. Kress said.

There will be four buildings—a woodroom, boiler plant, pulp mill and paper mill. The Baker Construction Company of this city has the contracts for building the pulpmill and the woodroom, and contracts for other two buildings will be let soon, according to Mr. Kress. Work on the pulp mill was started recently and foundation walls have been poured. A year will be required for completion of the entire project, Mr. Kress indicated.

Machinery will include a 174-inch wire and 160-inch trim paper machine. Bauer refiners will be used in the pulp mill.

The Hoberg Paper Mills sold the new company a tract of land about 2,600 by 400 feet, with the understanding that it could be used only to bring a new industry to Green Bay.

National Paperboard Association Meets at Absecon N.J.

Meetings of the membership and directors of the National Paperboard Ass'n., were held at Seaview Country Club, Absecon, N. J., on April 28 and 29, with the sessions presided over by President George E. Dyke.

Dyke submitted a report in which he covered conditions confronting industry at this time, paper board industry operations in 1947, the outlook for 1948, and improvement in quality of product.

Grafton Whiting, statistician, announced that the Paperboard Industry Statistical Yearbook for 1947 has been completed, this being the thirteenth consecutive year the booklet has been issued, and copies were handed to the members in attendance.

A. P. SCHNYDER

who has joined Ebasco Services Incorporated as engineer for pulp and paper mills. Mr. Schnyder's life-time experience has been tied up with the pulp and paper industry, particularly in the utilization of steam and power generation. He was associated with the late George F. Hardy, prominent paper mill engineer, for more than twenty years, prior to which he served with several European engineering firms. He was graduated from the Federal Technical University in Zurich in 1921.

A report on statistics, including a review of wall charts, was then presented by Alvin A. Newburg. This presentation covered in detail the following: Paperboard Industry Census, 1947; orders; mill activity; pulp; waste paper (receipts and consumption); production; analysis of the capacity of new paperboard machines now being built, and historical chart of production, growth trend and capacity.

Of particular interest was the statistical chart developed by Executive Manager Becker, covering the years 1925-1947, which included chart lines showing: Paperboard industry capacity (based on 100 percent industry activity); actual paperboard production, and average yearly growth trend of 5 percent.

J. C. LaGrua, of the National Folding Box Co., who is chairman of the Association's Biological Control Committee, submitted report, in which he described progress being made in connection with the general subject of biological control as related to the manufacture of paperboard.

He announced that in addition to the general research program, now under way, a number of paperboard mills are having surveys made at their mills, and that a university training course was established, which was attended by a number of paperboard mill representatives from the East and Middle West.

J. D. Malcolmson, of the Robert Gair Co., Inc., New York City, as the representative of National Paperboard Association on the Special Technical committee for Rule 41, reported upon progress made to date in cooperation with the representatives of the carriers, specifically mentioning that some improvement has already been brought about in the matter of packing requirements for certain specified articles.

Finley F. Bell, labor consultant, reporting on the labor situation covered employment and earnings; strikes, and the labor-management relations act.

At the April 29 membership session President Dyke announced that the board of directors had met on the preceding day and at his direction Secretary H. S. Adler read the report of

(Continued on page 38)

E.C.A. Newsprint Program Still In Abeyance, Declares Hoffman

WASHINGTON — Proposed newsprint shipments to the United Kingdom under the European aid program were indicated to be still in the indefinite stage by Paul G. Hoffman, European Cooperative Administration head, testifying last week before the Senate Appropriations Committee. Questioned closely about plans which have been detailed in State Department drafts of projected aid plans, Hoffman said his organization "has not been approached" in regard to newsprint, as yet.

Later it was said at ECA headquarters that various State Department aid plans were tentative, rather than final, and were subject to screening before being scheduled. One such proposal at the State Department contemplates 210,000 tons of newsprint in 1948-49, to be furnished by Canada, but with the United States meeting $25 million of the estimated $52 million cost involved.

Mr. Hoffman was asked about the general suggestion that the United States would finance newsprint shipments to Europe under the program, when he testified this week before the Appropriations Committee, the questions being directed particularly to United Kingdom purchases under a contract between the U.K. and Canada dating from 1946.

It was on this point Mr. Hoffman said his organization had not been approached. He added that it is his understanding that if any such purchases of newsprint are made by the U.K. in Canada, costs would be borne by the countries concerned.

However, said the ECA Administrator, he "would not close the door to such financing by the United States." He said newsprint abroad had a definite relation to recovery problems.

Mr. Hoffman revealed that his organization is actively interested in the newsprint problem abroad, to the extent that it is endeavoring to find ways of increasing European paper and pulp output, apparently in hope that this would ease pressure on supplies from this side. He told the committee he favored increasing European production, if possible, and it was learned, is consulting various newsprint and other technical assistance in this regard.

At the request of Representative Clarence J. Brown, chairman of the Select Committee on Newsprint and Paper Supply, the staff of the Economic Cooperation Administration has endeavored to obtain a full and complete report on the United Kingdom's proposed newsprint imports from Canada and Newfoundland. This statement was made public later in the week by Paul G. Hoffman, ECA administrator.

According to information obtained from official sources; Hoffman said, the United Kingdom estimates its requirements of newsprint from Canada and Newfoundland for the fiscal year starting July 1, 1948, at approximately 148,000 short tons. This estimate, Hoffman stated, represents an increase of approximately 33,000 tons over actual imports from Canada and Newfoundland in each of the last two calendar years.

The United Kingdom expects to obtain this newsprint under a ten-year contract with producers in Canada and Newfoundland, signed in August 1946. This contract, which is subject to periodic review and revision, was revised in July of last year due to UK's dollar shortage. Under this revision the United Kingdom reduced its scheduled imports from Canada and Newfoundland for calendar year 1948 to 112,000 tons.

Information available to the ECA indicates that the United Kingdom does not contemplate any increase in its current consumption of newsprint which is at the rate of about 8,000 tons a week. British sources declare, however, that the United Kingdom must take steps to rebuild its stocks on hand which have been declining steadily since August of 1946. They expect this decline to continue inasmuch as imports of mechanical pulp from Scandinavia have fallen short of estimates in recent months due to a dry spell in Sweden and Finland. They further estimate that by June 30 next, stocks on hand will be equivalent to less than 10 weeks' requirements.

Hoffman disclosed that figures obtained from official Canadian sources indicate newsprint production in Canada and Newfoundland during 1948 will be approximately 4,875,000 tons, of which 285,000 tons will be consumed in Canada. Shipments to the United States are expected to be 3,960,000 tons. The proposed shipments to the United Kingdom from Canada and Newfoundland will be about three percent of the Dominion's output for the next fiscal year, he added.

Pulpwood Conservationists To Meet in Durham, N. C.

ATLANTA, Ga.—The Southern Pulpwood Conservation Association's summer field meeting will be held at the Washington Duke Hotel, Durham, N. C., June 22-23.

The meeting will open with a dinner on June 22 at the hotel at which Ray F. Weston, chief forester of Hollingsworth & Whitney, Mobile, Ala., and president of the Association, will preside. Discussion will include a history of the Duke Forest, cooperative marketing of forest products and a plan of foresters-in-training in industry, all conducted by members of the faculty of the School of Forestry, Duke University.

June 23 will be devoted to an inspection of Duke Forest. Some of the experiments on the Forest are 15 years old, and reliable information is now available from this research. The work which will be inspected deals primarily with different methods of thinning, harvest cuts for establishment of reproduction, hardwood control, and volume of wood secured from different spacings in plantations. A feature of the field trip, following luncheon in the woods, will be a demonstration of a method of determining the wood growing capacity of forest lands through soil analysis.

The meeting is open to all those interested in forestry.

New England Watches G. O. P. Flood Policy

SPRINGFIELD, Mass.—Flood-conscious paper manufacturers throughout this area, who are keeping their on Washington to watch the outcome of measures aimed at increasing flood-defense projects in this area, have declared themselves disturbed at reports from the nation's capital that three economy-minded Republican senators are carrying their fight to reduce river, harbors and flood control expenditures to the Senate GOP policy committee.

Two of the senators—Reed of Kansas and Bridges of New Hampshire—have asked to appear personally before the committee. The third senator — Ferguson of Michigan — is a member of the group. They made their position known in a letter which Reed sent to the Chairman, Senator Taft of Ohio.

Then Reed told a news conference it is "unthinkable" that the issue would be ignored by the policy group. But he added that if the three receive no satisfaction there, they will take the case before the conference of all 51 Republican senators.

Specifically, Reed, Bridges and Ferguson want to hold down to about $415 million the amount the Army Engineers would get to carry on river, harbor and flood control work in the next fiscal year beginning July 1. This was the amount appropriated for the 1947 fiscal year.

International to Build New Container Plant

NEW YORK — The International Paper Company has acquired a site in Wooster, Ohio, for a new corrugated kraft board shipping container plant. Existing plants of the company's Container Division are located at: Chicago, Illinois; Georgetown, South Carolina; Springhill, Louisiana; Los Angeles, California; Kansas City, Kansas; Somerville, Massachusetts; St. Louis, Missouri; and Whippany, New Jersey.

NATIONAL STARCH PRODUCTS, INC., 53d ANNIVERSARY

More than 200 sales, manufacturing, and technical personnel attended the banquet which concluded the Fifth-Third Anniversary general company meeting of the National Starch Products, Inc., held recently at the Hotel Biltmore, New York City.

Sam Schuller Paisley's New Technical Dir.

CHICAGO, Ill.—Murray Stempel, vice-president and general manager, Paisley Products, Inc., reports the appointment of Sam Schuller as technical director of the firm's combined operations. Prior to his promotion, Schuller served as chief chemist of the Paisley Chicago laboratories. Born in Indiana, he received his education in Ohio, graduating from the University of Toledo with a B.S. degree in chemistry. He joined Paisley in 1937.

Polytechnic's Mark Speaks at Geneva

BROOKLYN, N. Y. — Dr. Herman F. Mark of Polytechnic Institute described latest developments of wood chemistry in North America at a session of Europe's topflight wood chemists last week in Geneva, Switzerland. Mark, an authority on plastics chemistry, is chairman of the United Nations subcommittee on wood chemistry, sponsor of the Geneva meetings.

Duke Joins Harris-Seybold

CLEVELAND — William Guy Martin, vice-president and Pacific district manager for Harris-Seybold, has appointed Ormel F. Duke to the firm as sales representative in Los Angeles and Southern California. Duke has been active in the Graphics Arts industry for the past 15 years, having had experience as a pressman, instructor, servicemen, cameraman, and platemaker.

City, County, State Buying Aid Offered

WASHINGTON, D. C. — National Institute of Governmental Purchasing, Inc., is conducting a purchasing information exchange operated by municipal, state and governmental purchasing departments to reduce delays, aid economies and cut purchasing costs for public buyers, Albert J. Hall, executive secretary, discloses.

Among items procured through the purchasing assistance of the organization are paper towels.

Municipal purchasing departments which have obtained special services include Perth Amboy, N. J., Philadelphia, Chicago and Cincinnati, Hall stated. Special services of this type are reported now to be available to all governmental purchasing executives who are members of the Institute.

Sandy Hill Again Elects F. A. Juckett

HUDSON FALLS, N. Y. — Frank A. Juckett was reelected president of the Sandy Hill Iron and Brass Works at the annual meeting held recently. Dr. Richard C. Tefft, of Newton Center, Mass., was renamed chairman of the board. J. Wesley Joslyn was elected vice-president. Other officers chosen were Philip J. Riley, treasurer; J. Walter Juckett, assistant treasurer and secretary; Albert E. Wilson, assistant secretary; and Frank M. Liedike, assistant treasurer.

The corporation has filed notice with the Secretary of State increasing the number of shares of its capital stock from 10,050 to 69,050 shares. The company formerly had 3,350 shares of preferred stock, no par value, and 6,700 shares of common stock having a par value of 50 cents. Such shares are retained as heretofore and the certificate authorizes the issuance of 59,000 shares of the par value of $5 each.

E. J. Cady & Co. to Chicago's 134 North LaSalle Street

CHICAGO, Ill. — E. J. Cady & Co., manufacturer of laboratory and control testing instruments, is now located in new and larger quarters at 134 North LaSalle Street.

Mathieson Chemical Appoints Dr. Morgan

NEW YORK—Dr. D. P. Morgan joins the Mathieson Chemical Corporation, formerly The Mathieson Alkali Works, on May 15 as Administrator of Research and Development. Dr. Morgan will be in charge of market research as well as chemical research and development. For the past two years he has been with W. R. Grace and Company in New York in charge of chemical market research and development.

Dr. Morgan was graduated from Harvard University in 1916 and received a Ph.D. in chemistry from Columbia University in 1923. He was a partner in the firm of Loomis, Stump and Banks, consulting chemical engineers, for four years before joining Scudder, Stevens and Clark as chemical consultant. For the last several years of the war he served as Director of the Chemicals Bureau of the War Production Board.

Whittier Honored for Milk Constituent Developments

WASHINGTON, D. C. — The Department of Agriculture has announced an award for "superior service" to Earle O. Whittier, of the Department's Bureau of Dairy Industry, for his work in development of methods and inventions for utilizing various constituents of milk in the manufacture of resins, casein fiber, lacquers, alcohol, and similarly related products. Whittier hails from Farmington, Me.

Talc Plant Burned

HAILESBORO, N. Y.—Fire on May 14 destroyed the 65-year-old mill operated by the International Talc Co., with loss estimated by firemen at between $150,000 and $200,000. The mill, in continuous operation since it was built in 1883, was producing 80 tons of talc daily.

Niagara Group Elects Officers O'Brien Addresses N. Y. TAPPI

NIAGARA FALLS, N. Y.—The monthly meeting of the Western New York Group Empire State Section, Technical Association of the Pulp and Paper Industry, was held on May 12 at the Prospect House.

A. H. Nadelman, International Paper Co., general chairman, welcomed the group. He then introduced J. Rudolph, Kimberly Clark Corp., Niagara Falls, acting chairman of the nominating committee in the absence of William Monnsson. The slate for the 1948-1949 season was presented and the following officers unanimously elected: General Chairman—J. Reichert, of E. I. DuPont de Nemours & Co.; Program Committee—G. H. Rand, Jr., of International Paper Co.; Dinner Committee—G. Storin of the Niagara Alkali Co.; Attendance Committee—W. Day, of Kimberly-Clark Corp., all of Niagara Falls, and Publicity Committee—I. Earle of the Upson Co., Lockport, N. Y.

Following the election, Mr. Nadelman introduced the speaker of the evening, R. J. O'Brien, plant manager, Moore Business Forms, Inc., Highland Plant, Niagara Falls, who spoke on "Use Requirements of Paper from a Converters Point of View." He told why the uniformity of paper is essential to message deposit by pencil, ink, typewriter ribbon, carbon paper, duplicator methods and printing presses. He discussed the importance of dimensional stability, opacity, various strength characteristics, moisture content and adequate protection of rolls in transit. Future developments to be expected in forms writing were discussed. At the close of his talk O'Brien answered questions offered by members of the group.

The meeting was attended by approximately 50 technical men from local and surrounding industries, among whom, in addition to those mentioned were: Charles Baker, R. Beehler, Ralph Benes, Jr., Ed. M. Braley, LeRoy Cantara, M. S. Cory, Merrill Eldridge, M. E. Fisher, J. J. Forsythe, Luke H. Grace, D. M. Hart, F. P. Heil, Richard H. Hinman, and Jack Hoffmester.

Also, Andrew Manz, R. F. Markel, Harry Mearbell, James Mocas, John Morrison, Robert F. Nelson, Jr., George Norton H. N. Rogers, Al Rohe, Robert D. Rusch, Salvatore M. Scaletta, Frank P. Shearer, William Shrubsall, B. J. Staneslow, W. O. Stauffer, Caleb S. Taft, Al Tiede, Robert G. Vaeth, L. Van Deursen, C. H. Van Dusen, Clinton Webber, F. R. Webster, Stephen V. Worthen and J. W. Youngchild.

Union Bag Executives Attend Service Banquet

HUDSON FALLS, N. Y. — The second annual service award banquet for employes of the Union Bag and Paper Corporation was held recently at the Queensbury where Alexander Calder, president of the company, was the principal speaker. P. Fay Marrs, resident manager, presided as toastmaster and introduced the other speakers who, besides Mr. Calder, included H. Stuart Daniels, True M. Avery, Leonard W. Doyle and C. W. E. Nicholson, vice-presidents.

A graphic description of what the local plant means to the corporation was presented by Mr. Daniels. He made it clear that the plant here was the pioneer, building the foundation which made the development possible at the Savannah, Georgia, property.

Mr. Avery spoke with pride of the leadership the company has attained in the industry, pointing out that representatives from similar industries all over the world are constantly visiting Union Bag in order to learn its methods and formulas. Commenting on the vast consumption of paper products in this country, Mr. Doyle saw a bright future in prospect for the industry as other countries follow our lead, creating vast markets. He told of the new bags which the firm is now manufacturing and the encouraging demand for these new products. Mr. Nicholson praised the employes and the company officials for the strong organization that such exceptional labor-management relations has produced.

Mr. Calder declared that the corporation has grown four times as fast as the industry and has been more successful profit-wise than most competitors. He declared that the plans of the corporation were completely upset during the last war because of government regulations. As a result of these regulations the company operated at a loss for several months during 1942, according to Mr. Calder. The very possibility of war will necessarily require material changes in plans for the future of the corporation, he declared.

New Macon Mill and Paper Machine Start Rolling

MACON, Ga. — Macon Kraft Co. started both its pulp mill and its 216-inch paper machine on April 29. The paper was OK within 30 minutes after the paper machine started. Operations, however, are still somewhat limited because construction work is not entirely finished.

Westvaco Chlorine Products Becomes Westvaco Chemical

NEW YORK—The corporate name of the Westvaco Chlorine Products Corporation will be changed to Westvaco Chemical Corporation in line with the expanded scope of the firm's activities following a vote by the stockholders at the annual meeting.

Commenting on this action, William B. Thom, president, said: "When the company was formed, our business was primarily chlorine, alkalis and chlorinated solvents, which are still an important part of our output. Acquisitions and plant expansions have made Westvaco one of the largest producers of barium and magnesium chemicals, bromine and brominated compounds, organic insecticides, fumigants and agricultural chemicals, phosphates and other chemical specialties."

The new soda ash plant at Westvaco, Wyo., and the elemental phosphorus developments at Pocatello, Idaho, still further emphasize the desirability of changing the corporate name, he added.

Badger-Globe Mill Holds Open House

NEENAH, Wis.—The Badger-Globe mill of Kimberly-Clark Corporation has completed its fire prevention and cleanup program with an open house at which more than 100 guests, members of employes' immediate families, were guided through the mill, given lunch and entertained at movies.

The guests were welcomed by H. B. Palmer, assistant mill manager, who introduced mill superintendents.

At a dinner for staff representatives and mill supervisors who inspected the entire mill, Fred Hollenbeck, mill manager, was master of ceremonies. Among the speakers were Fred Seaborne, chief mill manager; Gordon Mortensen, insurance; C. A. Fourness, chief of staff; Forest Werling, assistant chief mill manager, and Mr. Palmer.

Haegele Joins Hamilton As Assistant Manager

MIQUON, Pa. — W. C. Hamilton & Sons has appointed Paul Haegele as assistant manager of its main sales office in Miquon. Mr. Haegele was formerly associated with the Mead Corporation for nine years, in the Dill & Collins office. He will assist John Butterworth, who is in charge of the order and sales department.

Paper Corp. Closes Old Parsons Division

HOLYOKE, Mass.—The Parsons division of the American Writing Paper Corp. has been closed as a productive unit of the system. There are about 75 employes of the division and they are now being distributed among the other divisions of the corporation.

Ronald W. Hynes Heads Newton Falls Paper Mill, Inc.

NEW YORK—The annual stockholders' meeting of the Newton Falls Paper Mill, Inc., was held in the company's local office on May 10.

Directors appointed were: James H. McGraw, Jr., president and chairman of the board, and Curtis W. McGraw, senior vice-president and treasurer, of the McGraw-Hill Publishing Co., Inc.; Edwin S. Wilsey and Ronald W. Hynes of the Newton Falls Paper Mill, Inc.; Joseph S. Hildreth, president, and George C. Buzby, vice-president, P. M. Fahrendorf, vice-president, and John Blair Moffett of the Chilton Co., Philadelphia, Pa.

Officers elected were: Wilsey, chairman of the board; Hynes, president and treasurer; Curtis W. McGraw, vice-president; Hildreth, vice-president; Joseph A. Gerardi, secretary; John Schock, assistant treasurer, and A. M. Ross, vice-president in charge of woodlands and mining operations.

Hudson Valley TAPPI Elects Raymond Wiles

GLENS FALLS, N. Y. — Raymond H. Wiles, of this city, was chosen chairman of the Hudson Valley Chapter of the Technical Association of the Pulp and Paper Industry at a recent meeting held at Kingsbury. Among the other officers elected were Charles Sigvardt, program committee chairman; R. D. Moynihan, entertainment chairman, R. J. Trimbey, publicity chairman; and Charles N. Hagar, membership chairman.

The unit met in conjunction with the New York-Canadian Division of the Paper Mill Superintendents' Association. The principal speaker was Thomas Parlon, of the Yale and Towne Manufacturing Co., of Philadelphia, Pa., who discussed "The Paper Industry's Part in Modern Material Handling."

New Cellulose Plant Locates Wood Supply

VANCOUVER, B. C.—Timber from the Skeena, Bulkley, Naas and Kispiox valleys will be floated down the four rivers from which the valleys derive their names for the new plant of the Cellulose Corporation at Port Edwards when operations start, according to Col. Bert Tremblay, forestry engineer, who has recently completed a timber cruising trip through the central interior section of British Columbia. He stated the rivers would be used extensively in bringing the pulp wood out to salt water where it will be made into booms and towed to the plant.

Mazer Gives UJA $250,000

NEW YORK—A $250,000 gift to mark establishment of the Jewish State, which was proclaimed in Tel Aviv on May 14, has been made to the $250,000,000 United Jewish Appeal by Abraham Mazer, New York paper manufacturer.

TAPPI and Superintendents Join in Coast Meeting

GEARHART, Ore. — Three hundred and seventy-five members of Pacific Section TAPPI and the Pacific Coast Division of the American Pulp & Paper Mill Superintendents Ass'n. convened at Hotel Gearhart for their annual joint meeting, May 6-8.

Annual Pacific Section Meeting

The convention opened officially at 9:30 a.m., May 7, with the annual meeting of Pacific Section TAPPI. Harold C. Wall, Longview Fibre Co., Longview, Wash., was elected chairman of the section for the year 1948-49, and W. F. Holzer, Crown-Zellerbach Corp., Camas, Wash., vice-chairman. R. M. True, General Dyestuff Corp., Portland, Ore., was re-elected secretary-treasurer. The retiring chairman, J. L. McCarthy, and Ben Natwick, Pacific Coast representative, Appleton Wire Works, Inc., were elected to serve with the above officers on the executive committee.

Concurrently the Superintendents Division held a business meeting at which plans for the ensuing year were discussed.

Shibley Award Presented by TAPPI President

A joint technical session at 10:30 a.m. witnessed the Shibley Award ceremony and announcement of the 1947-48 winner. Wilbur F. Gillespie, Gaylord Container Corp., Bogalusa, La., president of TAPPI, introduced the four young technical men who had participated in the competition and presented them with autographed copies of Sutermeister's "Chemistry of Pulp and Paper." The winner, C. R. McCully, research department, Weyerhaeuser Timber Co., Pulp Division, was given a cash award for his paper "Determination of Metals in Pulp by the Dropping Mercury Electrode."

W. R. Barber, technical director, Crown-Zellerbach Corp., addressed the meeting on the meaning and purpose of the Shibley Award. Chas. E. Ackley, of that firm's Port Angeles, Wash., organization, who is fourth vice-president of the Superintendents Ass'n., reported on the Association's activities and outlined plans for the future. Gillespie spoke on the organization and growth of the Technical Ass'n. and its place in the pulp and paper industry, and K. P. Geohegan, Howard Paper Mills, Inc., Dayton, Ohio, a member of the executive committee TAPPI and chairman of the local sections committee, spoke on the affairs of the local sections and their relationships with the national organization.

At the luncheon which followed the morning session Col. W. B. Greeley, vice-president of the West Coast Lumberman's Ass'n., outlined measures which he said must be adopted to insure a perpetual supply of timber in the Pacific Northwest.

Pulp and Paper Group Sessions

The May 7 afternoon meetings were devoted to discussions of pulp and paper problems by industry men. After hearing formal papers by H. K. Kingsbury, Allis-Chalmers Mfg. Co., Milwaukee, Wis., on "Pumping High Consistence Paper Pulp" and John N. McGovern, U. S. Forest Products Laboratory, Madison, Wis., on "Semichemical Pulping of Red Alder and Douglas Fir," the meeting divided into two groups for further discussion.

The papermaking group conducted a round-table discussion on papermaking auxiliary equipment under the direction of E. N. Wennberg, Columbia River Paper Mills, Vancouver, Wash., while E. O. Ericsson, Puget Sound Pulp & Timber Co., Bellingham, Wash., and L. P. McGlothlin, Crown-Zellerbach Corp., Camas, presided jointly over a pulp panel at which current pulping problems peculiar to the West Coast were aired.

Informal dinner dancing in the hotel lounge completed the day's activities.

Peddlers Breakfast

Saturday, May 8, opened with the traditional Men's Breakfast sponsored by The International Brotherhood of Migratory Peddlers, W.R. No. 1, Portland, Ore. On this occasion Anton P. "Tony" Siebers, Longview Fibre Co., Longview, Wash., was initiated by an all-star cast.

The remainder of the morning was given over to a general session on some of the social aspects of the pulp and paper industry. J. M. Tedford, job analyst, Pacific Coast Pulp & Paper Mfr's. Ass'n., spoke on "Job Analysis," and the Rev. James A. Fogarty of Portland University discussed "The Taft-Hartley Law." Both talks evoked considerable discussion from the floor.

A golf tournament on Saturday afternoon and a banquet Saturday evening concluded the meeting.

Ladies' entertainment included a golf tournament on Friday, followed by a tea on the Gearhart veranda. Luncheon at the Marquee on Saturday preceded the ladies' bridge in the Gearhart lounge.

Rochester Box to Add

ROCHESTER, N. Y.—Rochester Folding Box Company has been granted a building permit to erect a factory addition in Boxart St. at an estimated cost of $30,000.

St. Regis Considers New Wage Contract

WATERTOWN, N. Y.—St. Regis Paper Company labor and management representatives are engaged in negotiations here for a new labor contract to cover plants in Watertown, Deferiet, Carthage, Harrisville, Norfolk and Oswego.

Negotiating with the St. Regis officials are representatives of five American Federation of Labor unions, including the Papermakers', the Pulp and Sulphite workers, firemen and oilers, electricians and machinists.

It was reported the unions are seeking a 20-cent per hour wage increase plus a five-cent differential for work on the two night shifts. A new vacation schedule is also being asked, it was understood, so that three weeks with pay would be given to employes with ten or more years' service. The maximum vacation now is two weeks with pay. The unions are also asking eight hours' pay for six holidays not now worked.

Present wage scales vary with the character of the work, but the base rate at the plants is $1 per hour.

Participating in the wage conference were Alex Smalley, New York personnel adviser to Roy K. Ferguson, St. Regis president; Clifford C. Wenzel, Deferiet personnel manager; Edward F. Marshall, Deferiet general manager, groundwood division; Louis C. Burdick, general superintendent, all representing management; and John Jones, Albany, first vice-president of the Papermakers' union; James Call, Utica, of the union's regional office, and others, for labor. The others include delegates from the union locals in each of the plants.

C.I.O. Loses Election At Fort Howard

GREEN BAY, Wis. — On May 11, an NLRB election was held at Fort Howard Paper Co. to determine whether United Paperworkers of America—C.I.O., should serve as bargaining agent for all production and maintenance employes. The election, which culminated almost two years of organizing efforts by the C.I.O., was unusual in that out of 470 eligible employes, 464 actually cast ballots. Of this number, there were 400 votes against C.I.O., 62 for C.I.O., and two challenged ballots.

AFL Wins Twice in Eau Claire Voting

EAU CLAIRE, Wis.—American Federation of Labor unions at two paper companies here have been certified as bargaining agents, it was announced May 7.

Results of a National Labor Relations board election at the Sterling Pulp and Paper company and The United Paper company gave the AFL unions a 395 to 24 victory over a CIO Local. Negotiations over new contract provisions and wage increase started last week.

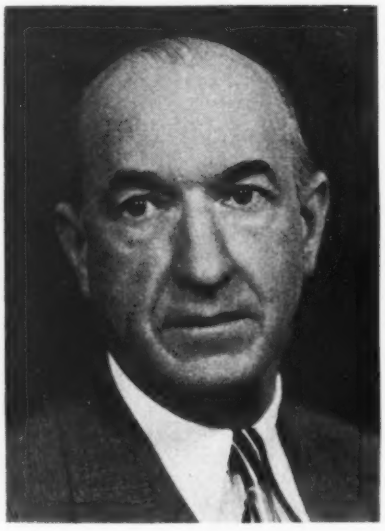
Unions selected to represent the 44 eligible employes are the International Brotherhood of Pulp, Sulphite and Paper Mill Workers and the International Brotherhood of Paper Makers. The CIO union was The United Paper Workers.

Canada Paper Workers Get Ten Per Cent Pay Raise

TORONTO, Ont. — Ontario, Quebec and Manitoba pulp and paper workers, A.F.L. affiliates, received a ten percent increase in wages last week. Some 14,000 members were affected by the new rates, which involve a minimum increase of 10 cents an hour, raising the basic rate to $1 an hour and the highest (boss machine tenders) to $2.64. The new rates will add about $5 million to the annual wage bill.

These pulp and paper union workers are not to be confused with the woodworkers who are members of the A.F.L. Lumber and Sawmill Workers' Union, who are said to be Communist-controlled.

This peaceful settlement continues the record of 25 years of strike-free operations. The companies involved include: Abitibi Power and Paper; Beaver Wood Fibre; Brompton Pulp and Paper; Great Lakes Paper; Kimberly-Clark of Canada; K. V. P.; Marathon Paper Mills; Ontario Paper; Ontario-Minnesota Pulp and Paper; Provincial Paper; Spruce Falls Power and Paper.



PAUL R. OLIVER

who has been appointed by Farrel-Birmingham Company, Inc., Ansonia, Connecticut and Buffalo, New York, as West Coast Manager, with headquarters at the company's office, 2039 Santa Fe Avenue, Los Angeles. Mr. Oliver has worked as service engineer for Farrel-Birmingham Company since 1942.

Finch Pruyn Signs New Pay Contract

GLENS FALLS, N. Y. — Negotiations have been completed by officials of Finch, Pruyn & Company and labor representatives under which all employes will receive an increase in wages of eleven cents hourly, retroactive to April 18. The new contract also provides for the payment of double time for Memorial Day, Thanksgiving and New Year's Day.

Under the previous contract, time and a half was paid for these holidays. The new agreement will remain effective until May 11, 1949.

John P. Burke, president of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, served as spokesman for the labor group while Samuel Pruyn, vice-president of the firm, served in a similar capacity for the company. Other company officials present at the negotiation included H. F. Bullard, vice-president and secretary; Lyman A. Beeman, vice-president; and Louis T. Valley.

A statement issued by labor leaders stated that the group of unions has been bargaining collectively with the company since 1918 and that relations have always been conducted on a most cooperative basis. Among the officials of the International Brotherhood of Papermakers at the meeting were Frank P. Barry, Bernard Burns, Albert Tracy and E. W. Devers. Officials of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers present included John P. Burke, Bernard Oddy, Raymond Leon and Fred Powers.

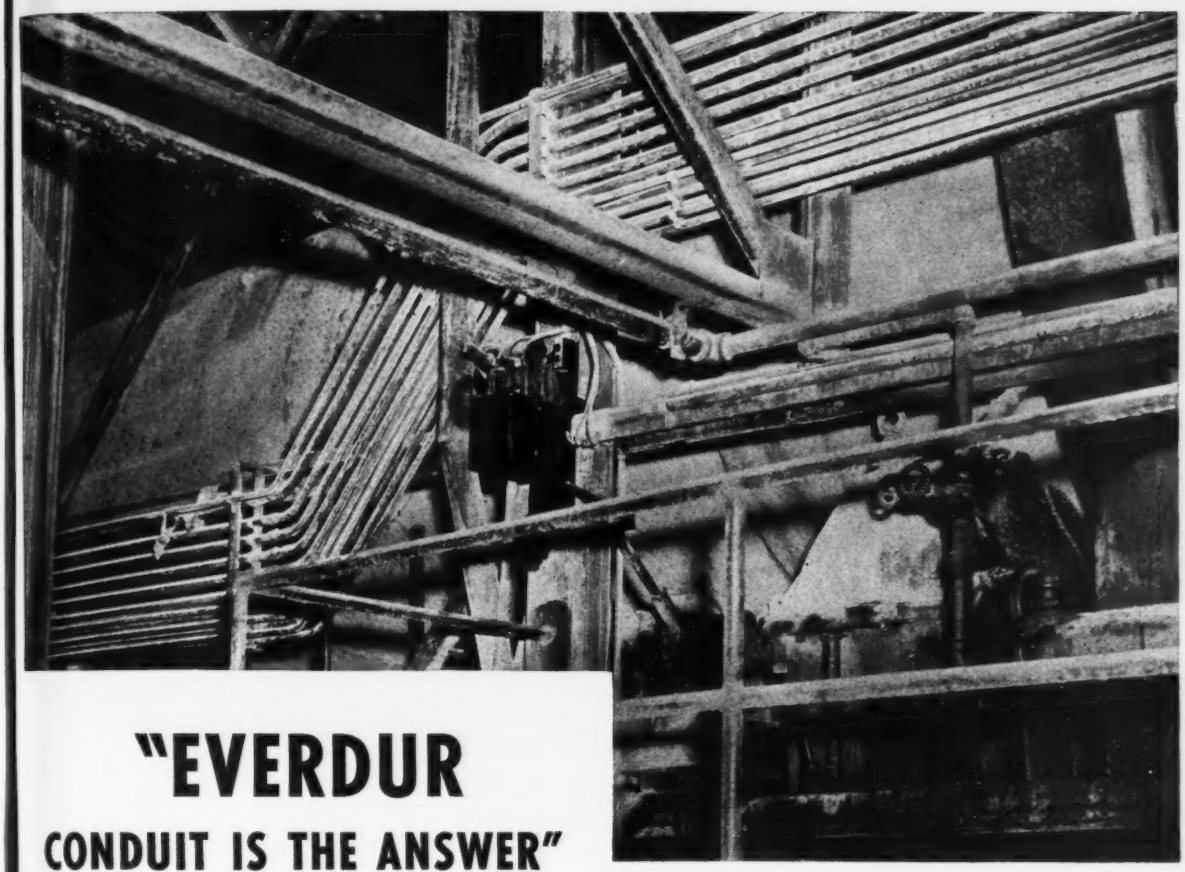
Hudson Party Inspects New Palatka Mill

PALATKA, Fla.—Abram Mazer, president of the Hudson Pulp & Paper Corporation, New York, with a party of New York officials and others arrived here May 15 for the open house and general inspection of the corporation's local plant. The mill management provided for special aides to conduct visitors through the plant.

Senator B. C. Pearce was toastmaster at a dinner meeting for officials of the paper corporation, and responses were made by President Mazer and other corporation officers and visiting dignitaries. Several State officials were here for the dinner party and mill inspection.

Badger Breaks Ground

MARINETTE, Wis.—Badger Paper Mills, Inc., has broken ground and is installing footings for a new two-story 45 by 105 addition, to house supercalenders and to use for "Freshrap." The company has just completed installation of a new stainless steel hot acid tank on the paper mill side.



"EVERDUR CONDUIT IS THE ANSWER"

. . . says Chief Engineer of West Virginia Pulp and Paper Company

LIKE MANY another paper mill, the Caustic Plant of the West Virginia Pulp & Paper Company at Luke, Md., has been using large quantities of Everdur* Conduit—in this case for 12 years. Says the plant's Chief Engineer, F. L. Davis:

"In places where corrosion has given us considerable trouble in the past, Everdur Conduit has been the answer. We find that it is economical to use Everdur Conduit in corrosive atmospheres and wherever circuits are subject to water washings from floors."

Everdur Conduit may eliminate *your* electrical circuit corrosion problems too. For Everdur has corrosion resistance equal, or superior, to copper. Installations made since 1933 have shown time and again that, where ordinary conduit fails in months, Everdur Conduit lasts for years.

Everdur Copper-Silicon Alloy Conduit possesses high strength, is non-magnetic, workable and weldable. It is available in two wall thicknesses: rigid conduit (RC) in nominal sizes from ¼" to 4" inclusive; and the thinner walled electrical metallic tubing (EMT) in nominal sizes ⅜" to 2" inclusive. Complete lines of fittings . . . connectors, couplings, outlet boxes, etc. . . . are available in Everdur Alloys from leading manufacturers. 48221

*Reg. U. S. Pat. Off.

ANACONDA
from mine to consumer

Everdur

ELECTRICAL CONDUIT

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD.
New Toronto, Ont.

$1.5 Million Reserve For IPCO Depreciation

NEW YORK—Earnings of the International Paper Company and its subsidiaries for the first quarter of 1948 amount to $13,313,408 or $3.68 per share of common stock after providing for dividends on the $4 preferred stock. After appropriation of $1,500,000 toward a reserve for replacement of capital assets at the excess of current cost over the original cost of those assets the balance of earnings for the first quarter of 1948 carried to earned surplus was $11,813,408 or $3.25 per share of common stock. The regular depreciation is no longer held to be sufficient to cover present high costs of replacement and this appropriation which it is proposed to continue in subsequent quarters of 1948 is to help to close this gap.

"Demand -for our products," declared Chairman Richard J. Cullen, "has continued to exceed our ability to produce. During this quarter we experienced bad weather conditions which resulted in restricted output. In the South abnormally heavy rains restricted pulpwood operations; in Canada low water conditions seriously restricted power supply at the mill of one of our Canadian subsidiaries. These conditions are now much better and production should be close to capacity during the second quarter.

"The trend of costs is still upward. We have just concluded labor negotiations for our United States paper mills for the coming year and have granted increases in wages. Our Canadian subsidiaries are now negotiating wage agreements for the coming year. We also have had a further increase in freight rates and increases in the cost of materials and supplies.

"During the year 1947 regular dividends were paid on the common stock at the rate of $3 a share per year and a year-end extra dividend of $1 per share was paid, bringing the total dividends paid during 1947 up to $4 per share. We have continued the $3 rate for the first quarter of 1948.

"During 1948 there will be a need for funds for future construction, and additional accounts receivable and inventories. Just how much will be required for these purposes we do not know but we do know that whatever is required must come out of earnings if the companies are to remain free of funded debt.

"As the year goes on and as we know what our earnings and cash needs are, the board of directors will be able to determine the amount of dividends which can be paid on the common stock.

"At previous annual meetings I have described to you the retirement plans adopted by International Paper Company and by Canadian International Paper Company. In 1947 the past service benefit cost was completely paid up for both plans and in the future the cost to the companies will be limited to the current service charge amounting to about $1,600,000 per year based on payrolls and membership as of January 1, 1948. Of the total cost of future service benefits the companies pay about 56 percent and the employees about 44 percent.

"Production in the paper industry on this continent has expanded to the highest point ever known. Many inefficient non-integrated mills are operating to meet the present high demand for paper and are selling their product at prices very much in excess of those charged by the more modern integrated companies. Such high cost mills are bound to be the first to suffer should production catch up with demand. As to mills of our companies I can only say that they are thoroughly competitive with the best mills in the industry. Our financial position is unassailable. Our personnel is the best obtainable. We are thus in a position to meet whatever conditions the future may bring forth."

Supplementing the foregoing, Mr. D. S. Gottesman pointed out to the meeting:

"The remarks which you have just heard by Mr. Cullen, together with the last annual report of the company, set forth a remarkable record of achievement. I think it can be safely said that there are few industrial corporations in the country whose record for the past decade can match that of the company, and I feel that the management can be justly proud of what has been accomplished.

"As the company is this year celebrating its 50th anniversary, it is not inappropriate to look back, particularly over the last ten years since this present management took hold of its operations. At that time the company was buried under a mountain of debt almost threatening insolvency. It took a great deal of vision, initiative and courage to reconstruct the position of the company to what it is today. Its rise to the largest paper company in the world is an outstanding industrial romance in the best American tradition. I think Mr. Cullen, Mr. Hinman and Mr. Weaver are to be congratulated on the successful outcome of their combined efforts. Mr. Cullen supplied the ingenious leadership, Mr. Hinman the industrial statesmanship and Mr. Weaver the astute financial brains which made this working team so eminently successful.

Speaking for myself and my associates, I feel that the stockholders have been very fortunate in having this type of management run the company, especially during the trying war years.

"In addition to setting up the International Paper Co., as the leading factor in the paper industry, the management has done something more for the industry which deserves comment at this particular time.

"Before 1938, the paper industry as a whole was looked upon by bankers and investors generally as a backward, depressed industry. By giving this company the outstanding leadership which it has had, the entire paper industry is now being completely reappraised. Once again, banks, insurance companies and the investing public generally, are beginning to feel that the paper industry is a sound industry with great potentialities, and much capital which formerly was withheld is again flowing into paper industry securities. A great deal of credit for this change is due to the constructive policies which have been followed by this management.

"It is a privilege and a pleasure to extend my personal congratulations to the directing heads of this company and their associates whose loyal cooperation made this fine record possible."

Connor Joins Ohio Boxboard As Manager of Research

RITTMAN, Ohio — C. M. Connor has joined the Ohio Boxboard Company as manager of the research and development department. He will fill the position previously held by J. C. Morris, who is assuming a new position in the production division.

Mr. Connor comes to the Ohio Boxboard Company from the Glassine Paper Company where he was manager of Pennsylvania mills. Technically trained in pulp and paper industries he brings a broad experience in control, sales, production and management with him.

In the fifteen years with the Glassine Paper Company he was associated with many packaging developments. He also directed, during this time, the Valley Forge Laboratories. During the war Mr. Connor was a member of the Pulp and Paper Technical advisory committee of the War Production Board.

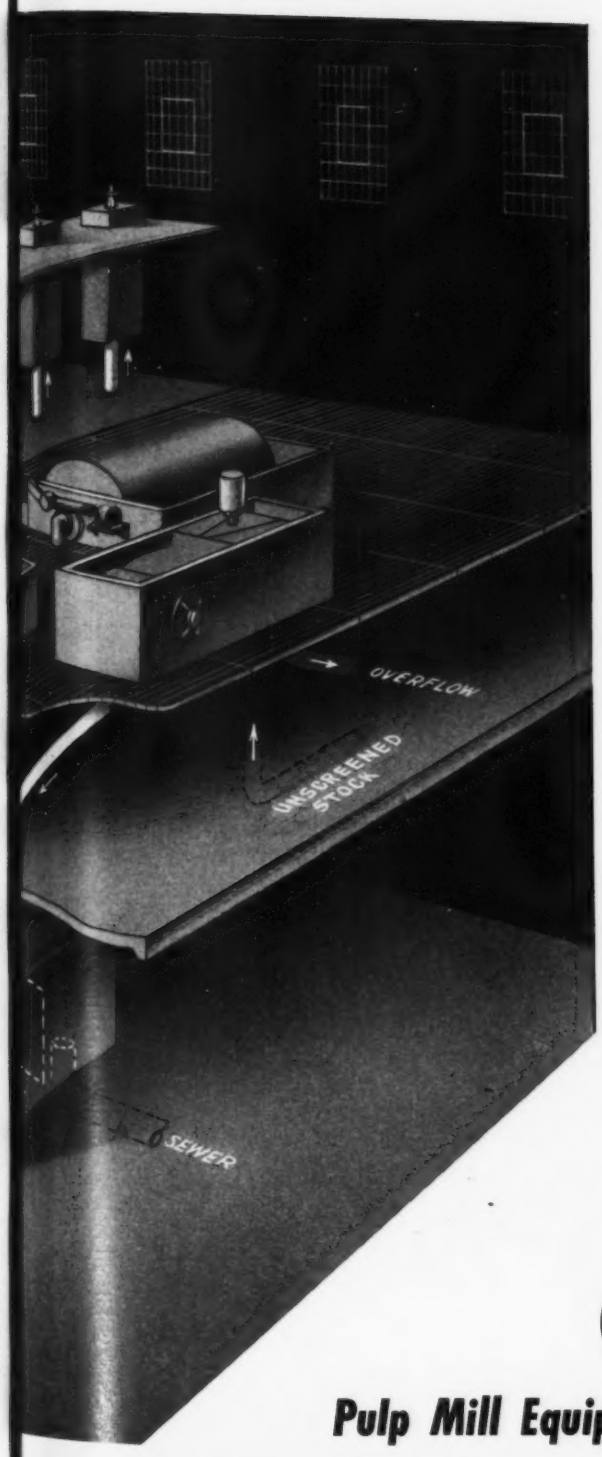
He is a member of the American Institute of Chemists, the Superintendents Association and TAPPI.

Schwarz 25 Years With Kupfer Bros. Co.

BOSTON, Mass. — William Schwarz, New England representative of Kupfer Bros. Co., manufacturer of coated and decorative papers, recently completed 25 years of service with the company. He started in 1923 in its German factory at Fuerth, Bavaria, and came to the U.S. in 1930, working at the Northbridge, Mass., mill until 1938 as production supervisor. Since joining the sales staff, Schwarz has covered New York City and State, New Jersey, and New England. The Kupfer Bros. Boston office is at 88 Broad Street.

in a modern, efficient

Screen Room Layout?



Several mills are now planning layouts similar to this. To achieve operation on more nearly one level the knotters are no longer in the screen room but are used before the brown stock washers.

Notice particularly the following:

- . . . Flat screens are arranged in short lines at slight pitch
- . . . Submerged inlets and forming aprons
- . . . Stock is fed like paper machine from "fan" pump
- . . . Intermediate underflow re-dilution between screens
- . . . Stock consistency and quantity controlled by regulator and Impco Stock Volume Meter
- . . . All lines side by side so any proportion of total lines can be used for "primary," "secondary" or "tailers"

Weigh these factors for higher capacity and finer quality. If you are considering a new screen room or a better arrangement of present facilities, let us talk with you.

Improved Paper Machinery Corporation
Nashua, New Hampshire A-13

Impco

Pulp Mill Equipment "From Cooking to Use"

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, May 19, 1948.

News highlight for the week was a statement from Paul G. Hoffman of the Economic Cooperation Administration regarding the touchiest spot in the paper and publishing fields: the proposed purchase of Canadian newsprint with ECA dollars for Britain and Eire. Mr. Hoffman told the Congress that the administration has no thought of financing shipments of Canadian newsprint to Europe, that there is idle capacity for making newsprint in western Europe and plentiful woodpulp and skilled labor.

According to F. L. Mitchell, manager of the Canadian Pulp and Paper Association, a recent survey shows that European newsprint machine capacity, while less than prewar, is 500,000 tons in excess of estimated current demand, also that 1,500,000 tons is standing idle because of the need of minor repairs and raw materials.

Annual report of Bowater Paper Corporation, parent company of the Bowater mills in Newfoundland and England, stated that British newsprint production is down to 24 percent of capacity. Details are as follows: "In July 1947, the maximum permitted basis of operations of the British newsprint mills was reduced from 35 percent to 33⅓ percent of normal capacity. While the controlled selling price was increased, the Government also charged newsprint producers more for their raw materials. At the beginning of 1948, the basis of operations was cut to 20 percent of normal, a rate said to be little above the lowest level touched during the worst period of the war. Since then operations have been permitted to go up to 24 percent of normal, which means that the newsprint producers of the United Kingdom are operating at a loss. Present UK newsprint capacity is estimated at approximately 725,000 tons against 1.1 millions tons prewar. On the basis of 24 percent of normal operations, it would indicate that the UK is presently producing at the annual rate of around 180,000 tons.

The Newsprint Supply Company, buying agent for newsprint used in England also allocator of supply to British newspapers, notified its newspaper publishers that effective April 30 the price of newsprint had been increased to £45 ($180) per long ton, (comparable price for a short ton $160.)

Consumption of newsprint in Great-Britain per head has been so greatly cut that, interpreted in terms of national literacy, Great Britain has relapsed from the position of senior to that of nearly moron, according to a writer in the *London Economist*. No country except Japan has suffered proportionately so large a fall "in the mental nourishment the newspaper may be said to provide" he said.

Speaking to the Associated Press at the Waldorf Astoria in New York, April 19, Lord Rothmere, chairman of the London Newspaper Proprietors' Association and successor to Lord Beaverbrook as chairman of the board of the Newsprint Supply Company, noted that the newsprint situation in Britain is getting worse and that there is "a possibility of a reduction from four pages to two." At the same time, he praised the plan to buy newsprint for Britain with ECA dollars as "enlightened statesmanship."

Discussing the newsprint restrictions in Britain at the recent annual meeting of the Bowater organization, Sir Eric Bowater gave as his opinion that British mills should be their own main newsprint supply source, the newspaper publishers "have tended to rely to too great an extent upon the dollar area as a source of supply for newsprint, their essential raw material. Year in and year out, I have stated the belief that in the long run British mills must be the main source of supply of newsprint for the newspaper and periodical publisher of this country."

Waste Paper

The market for all grades of waste paper is disappointingly dull for May, traditionally the month when the mills add to their inventories. Low bulky grades are in heavy supply with quality packings in easy demand and poor packings not moving. Pulp substitute grades too are not enjoying the usual strong demand, which is considered by the trade to indicate cutback production schedules rather than larger available supplies of wood pulp. Mills are said to be anticipating price easing on these grades. Old corrugated alone shows brisk call and insufficient supply.

Collections during the weeks ended May 1 and 8 were somewhat behind those of the corresponding weeks of 1947, the Eastern Conservation Committee reports. Consumption during the same weeks was higher. Inventories are lower than at any time since March 1, the chief losses showing up in the container and mixed grades, indicating that traditional May buying for inventories will be for well-packed *mixed* paper of good quality, with *old corrugated* running a close second. (The mills now have more *news* on hand than any other grade, and it is of all grades the most plentiful in the current market. As ECA funds become available, it is expected that export demand for news may tighten the market for *news* grades.) Thus far there has been little buying for inventories this spring, the mills having drawn on heavy supplies to meet current production.

It is reported by the E.C.C. that as a result of the extremely soft market for mixed paper, collections have been "drying up" during recent weeks, while institutional collections have kept the market supplied with news. Collections of old containers this year have been much ahead of the last two years, and consumption has been much greater—slightly ahead of collections—so that mill inventories are approaching the three-year low reached last June on this grade.

Eastern mills have purchased and consumed more waste paper this year than during any previous comparable period.

United Kingdom Newsprint Supply

	1935-39	1946	1947	1948 (estimated)
From Canada	142,000	68,000	57,000	65.000
From Newfoundland	190,000	40,000	64,000	46,000
Scandinavia & Domestic	938,000	322,000	314,000	289,000
	1,270,000	430,000	435,000	400,000

Cottons

The market for new cuttings essentially is stabilized where it has been for several weeks. Fine writing paper mills, cutback in production because of shrinking demand for rag-content papers, are buying meagrely and waiting for lower prices. Supplies are tight and prices firm.

Trading in cotton rags likewise is narrow, supplies limited and buyers uninterested in purchasing more than current needs. Roofing rags are off $3.00 per ton on No. 2's, other grades showing parallel dips. Other prices are maintained.

Paperboard

During the week ended May 8, paperboard production amounted to 191,787 tons, an increase of 7.1 percent over the corresponding week of 1947. New orders totaled 213,822, compared with 201,340 for the preceding week, and 159,888 for the corresponding week of 1947. Unfilled orders for the week were 418,994 tons against 397,404 tons for the preceding week, and 560,526 during the corresponding week of 1947.

Index

The index of general business activity for the week ended May 8 inclined to 151.2 from 150.3 in the preceding week, compared with 145.9 for the corresponding week of 1947. The index of paperboard production rose to 201.0 from 198.7 in the previous week, compared with 187.8 for the corresponding week of 1947.

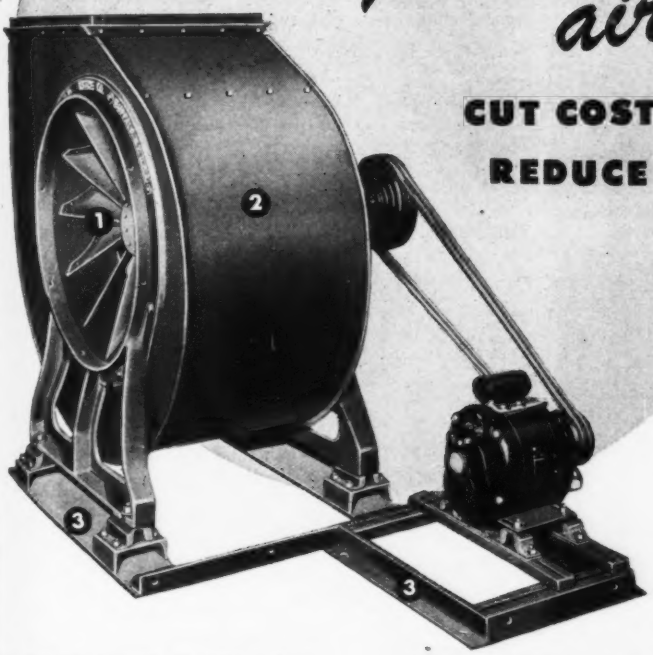
(Continued on page 25)

AIR EQUIPMENT TO HELP YOUR BUSINESS

"LL" FEATURES *that bring you more air*

CUT COST

REDUCE NOISE



1 INLET GUIDE VANES reduce turbulence and air noise—guide the air into fan efficiently, even with elbows or obstructions near inlet. These vanes also act as a safety guard without the air flow resistance of an ordinary screen. Stationary inlet vanes are standard with "Buffalo" "LL" Fans, although variable inlet vanes may be ordered.

2 NEW, IMPROVED HOUSING DESIGN, the result of years of research, produces higher efficiencies and lower noise levels. Cut-off is tangent to wheel, and interior surface is smooth.

3 Where desirable, extra quiet, smooth performance is obtained by specifying the "Buffalo" SILENT FLOATING BASE AND DRIVE, which isolates motor noise or vibration from the building.

4 FAN BLADES, below, are die-stamped in double-curved design that means extra stiffness—permits lower speeds with high deliveries. ROTORS are accurately balanced for vibrationless performance.

FOR LARGE-SCALE AIR MOVING, put an "LL" Fan on the job! All arrangements, many sizes. Belted or direct drive. All non-overloading.

WRITE for Bulletin 3359

BUFFALO FORGE COMPANY

159 MORTIMER STREET BUFFALO 4, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Branch Offices in all Principal Cities

FANS by "Buffalo"

EQUIPMENT FOR

- ★ VENTILATING
- ★ HEATING
- ★ COMFORT COOLING
- ★ PROCESS COOLING
- ★ AIR TEMPERING
- ★ AIR WASHING
- ★ EXHAUSTING
- ★ BLOWING
- ★ FORCED DRAFT
- ★ INDUCED DRAFT
- ★ PRESSURE BLOWING
- ★ CLEANING
- ★ DRYING

CUTTING AIR COSTS IN EVERY BRANCH OF INDUSTRY

PRICES

The quotations given below are indicative of trends in an open market. At the moment they can be of little more value for while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—
Rolls, contract .... $93.00/$96.00
Sheets 108.00/109.00

Kraft—per cwt.—Carload Quantities
Zone A Deld. 40 lb. base wgt.

Superstandard Wrapping	$9.00/ —
No. 1 Wrapping	7.25/ 8.00
Standard Wrapping	6.50/ —
Standard Bag	6.50/ —

Tissues—Per Ream 24x36 (480) 11 lb. Zone 1.

Wh. No. 1 Frd.	$1.84/$2.00
Wh. No. 1 M. G.	1.94/ 2.00
Wh. No. 1½	1.60/ —
Wh. No. 2	1.75/ —
Kraft Anti-Tar	1.65/ —
Kraft Unbl.	1.85/ —
Manila No. 2	1.62/ —
Shred. Wh. No. 1 cwt.	1.10/ 1.50

Toilet—Per Case of 100 rolls—1 M Sheets.

Unbleached	$8.50/$10.00
Bleached	8.50/ 10.00

Paper Towels—Per Case of 3750—Zone 1.

Wh. Jr. M'tif'd 9¼x9½	$5.15
Br. Sr. M'tif'd 10x12	3.60
Br. Jr. M'tif'd 9½x9¾	3.10
Br. Jr. Sgl. fold 10x10¾	3.15

Manila—per cwt.—C-l. f.a.

No. 1 Jute Tag	$14.50/ —
Reg. Jute Manila	13.25/$15.50
No. 1 Manila	9.75/ —
5 lb. Manila	10.75/ 11.25

Boards, per ton—

Plain News	$92.50/ —
Filled News	94.00/ —
Plain Chip	90.00/ —
Sgl. Mla. L-d. Chip*	100.00/102.50
White Pat. coated*	120.00/ —
Kraft Liners 42 lb.	100.00/ —
Kraft Corr. .009	105.00/ —
Binders Boards	126.00/ —

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—White, 16 lb.
Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext.			
No. 1	$55.00	$50.80	$48.70
100% Rag	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Ledgers, per cwt.

100% Rag Ext.			
No. 1	$55.00	$50.80	$48.70
100% Rag	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Sulphite Bonds and Ledgers—White, 16 lbs.
Bonds, per cwt.

No. 1	$21.25	$19.25	$18.50
No. 2	20.25	18.30	17.55
No. 4	19.25	17.55	16.85

Ledgers, per cwt.

No. 1	$21.75	$19.65	$18.85
No. 2	20.75	18.75	18.05
No. 4	20.00	18.10	17.35

Free Sheet Book Papers—White, Cased Paper

(Per cwt.)	Case	Ton
No. 1 Glossy Coated	20.40	$19.50
No. 2 Glossy Coated	19.15	18.30
No. 3 Glossy Coated	18.40	17.60
(Per cwt.)	Case	Ton
No. 1 Antique (Watermarked)	$15.90	$15.15
No. 2 Offset	15.15 to 17.90	14.60 to 17.10
A Grade E. F.	14.90	14.25
A Grade S. & S. C.	15.40	14.65
B Grade E. F.	13.90	13.30
B Grade S. C.	14.40	13.70

Wood Pulp

Domestic mill contract prices delievered with varying freight allowances.

	Per Short ADT
Groundwood	$80.00/$81.00
Unbleached Sulphite	124.00/ —
Bleached Sulphite	125.00/135.00
Bleached Soda	130.00/ —
Bleached Sulphate	175.00/185.00
Unbleached Sulphate Northern	125.00/155.00
Unbleached Sulphate Southern	130.00/145.00

Canadian Quotations

Prices delivered with varying freight allowances unless otherwise specified:

	Per Short ADT
Reg. North. Kraft	125.00/130.00
Unbleached Sulphite	125.00/126.00
Bleached Sulphite	125.00/135.00
Glassine Unbleached Sulphite (no freight allowance)	120.00/ —
Bleached Soda	130.00/ —
Groundwood	80.00/ 85.00
Sideruns Pulping News	80.00/ 90.00
Hardwood and Specialty Grades	Nominal

Swedish Quotations

On dock, Atlantic Ports

Bleached Kraft	185.00/195.00
Bleached Sulphite	185.00/195.00
Unbleached Sulphite	155.00/175.00
Unbleached Kraft	147.50/165.00

Finnish Quotations

On dock, Atlantic Ports

	Per Short ADT
Bleached Sulphite	$187.50/ —
Unbleached Sulphite	155.00/157.00
Unbleached Sulphate	147.50/ —

New Domestic Cotton Cuttings

(F.O.B. Shipping Point Plus Dealer's Commision)

White Shirt	$11.50/$12.00
Unbleached Muslin	12.00/ 12.50
Light Silesias	9.00/ 9.25
White Back Blue Overalls	9.00/ 9.50
Blue Overalls	8.00/ 8.25
Fancy Shirt	6.00/ 6.25
Light Percales	8.50/ 8.75
Light Prints	7.50/ 7.75
No. 1 Washables	5.00/ 5.25
Bleachable Khaki	7.50/ 8.00
Unbleachable Khaki	6.50/ 7.00
Cottonades	5.50/ 5.75

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$5.50/ $6.00
No. 1 Whites Miscellaneous	4.50/ 5.00
No. 2 Whites Repacked	3.50/ 3.75
No. 2 Whites Miscellaneous	3.00/ 3.50
Blue Overalls	3.75/ 4.00
Thirds and Blues Repacked	3.25/ 3.50
No. 1 Roofing Rags	1.70/ 1.80
No. 2 Roofing Rags	1.60/ 1.70
No. 3 Jute Bagging	1.50/ 1.60
No. 4 Brussels and hard back carpets	1.50/ 1.60
No. 5A Roofing Rags	1.50/ 1.60

New Foreign Cotton Cuttings

(Prices to Mill, F.O.B. Dock, N.Y.)

	Per 100 lbs.
New Dark Cuttings	$5.50/ $5.75
New Mixed Cuttings	6.25/ 6.50
Light Silesias	9.25/ 9.50
Light Flannelettes	9.25/ 9.50
New White Cuttings	12.00/ 13.00
New Unbleached Cuttings	12.25/ 13.00
Fancy Shirt Cuttings	6.50/ 7.00
Light Prints	7.75/ 8.00
Bleachable Khaki, No. 1	7.00/ 7.50
Unbl. Khaki, No. 1	6.25/ 6.75

Old Foreign Rags

(Prices to Mill, f.o.b. dock, N.Y.)

	Per 100 lbs.
No. 1 White Linens	$14.00/$16.00
No. 2 White Linens	12.00/ 13.00
No. 3 White Linens	8.00/ 9.00
No. 4 White Linens	8.00/ 9.00
No. 1 White Cottons	8.00/ 10.00
No. 2 White Cottons	7.00/ 8.00
No. 3 White Cottons	6.00/ 6.50
No. 4 White Cottons	4.00/ 4.50
Extra Light Prints	6.50/ 7.00
Old Light Prints	4.50/ 5.00
Med. Light Prints	4.00/ 4.50
Dutch Blue Cottons	5.25/ 5.50
Checks and Blues	4.00/ 4.25
Linsey Garments	2.35/ 2.50
Dark Cottons, European	2.25/ 2.30
Dark Cottons, Egyptian	3.25/ 3.50
Old Shopperies	2.20/ 2.30
New Shopperies	2.25/ 2.30

Bagging

(Prices to Mill, f.o.b. N.Y.)

	Per 100 lbs.
Foreign Gunny, No. 1	$6.75/ $7.25
Domestic Gunny, No. 1	6.75/ 7.25
Heavy Wool Tares	6.25/ 6.50
No. 1 Scrap Bagging	5.50/ 5.75
Roofing Bagging	1.50/ 1.75
Foreign Manila Rope	6.00/ 6.75
Domestic Manila Rope	6.50/ 6.75
Jute Strings	5.00/ 5.25
No. 1 Sisal Strings	5.25/ 5.50
Mixed Strings	1.75/ 2.50

Waste Paper

Base Prices to Mills for Average Packings
(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$155.00/$165.00
No. 1 Hard White Envelope Cuts	145.00/ 155.00
No. 1 Hard White Shavings, unruled	140.00/ 150.00
No. 1 Hard White Shavings, ruled	110.00/ 130.00
Soft White Shavings, one cut	140.00/ 150.00
No. 1 Soft White Shavings	125.00/ 135.00
Soft White Shavings, Misc.	115.00/ 125.00
No. 1 Fly Leaf Shavings	45.00/ —
No. 1 Groundwood Fly Leaf Shavings	35.00/ —
N. 1 Heavy Books & Magazines	25.00/ 26.00
Mixed Books	15.00/ 18.00
No. 1 White Ledger	75.00/ 80.00
Col. Ledger	55.00/ 60.00
Manila Tab. Cards	95.00/ 100.00
New Manila Envelope Cuttings, one cut	100.00/ 110.00
New Manila Envelope Cuttings	65.00/ 75.00
Extra Manilas	25.00/ 30.00
Mixed Kraft, Env. & Rag Cuttings	75.00/ 85.00
Kraft Envelope Cuttings	100.00/ 110.00
Triple Sorted, No. 1 Brown Soft Kraft	65.00/ 75.00
New Kraft Corrugated Cuttings	70.00/ 75.00
No. 1 Assorted Old Kraft	50.00/ 55.00
New Jute Corrugated Cuttings	27.00/ —
Old 100% Kraft Corrugated Containers	35.00/ 40.00
No. 1 News	13.00/ 14.00
No. 1 Mixed Papers.	10.00/ 11.00
Box Board Cuttings	— / —
White Blank News	75.00/ 85.00
Overissue News	16.00/ 17.00
Old Corrugated	23.00/ 25.00
Mill Wrappers	22.00/ 24.00

Twines

All Prices Nominal, F.o.b. Mill

(Soft Fiber)

Coarse Polished—	
India	.33¾/ .35
Fine India	.38¾/ .42½
Fine Polished	
Unpolished—	
Paper Makers	.28¾/ .30¾
Tube Rope	.29 / .31½
Wrapping	.32 / .35¾
Cotton	.63¾/ .66¾

(Hard Fiber)

Mex. Sisal	.21 / .27
Manila (Reprocessed)	.30 / .32

(American Hemp)

Polished Hemp	.36¾/ .60
Unpolished	.32¾/ .54

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings—	
New White No. 1	.11 / .12
New White No. 2	nominal
Light Silesias	.07½/ .08
Black Silesias, soft	.06½/ .07
New Unbleached	.10½/ .11¼
Washable Prints	.06½/ .07
Washable No. 1	.05 / .05½
Blue Overall	.07¼/ .08
Cottons—According to grade—	
Washable Shredding	.03¾/ .04
Fancy Percales	.06¾/ .07¼
New Black Soft	nominal
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.06 / .06½
Bleachable Cotton Cuttings	.07 / .07½
Men's Corduroy	.05½/ .06
Ladies' Corduroy	.05 / .05½
Cottonades	.05½/ .06

Domestic Rags (Old)

(F.O.B. Eastern Shipping Point)

White No. 1 —Repacked	4.50 / 5.00
Mixed White	4.00 / 4.25
White No. 2—Repacked	3.50 / 3.75
Thirds and Blues—	
Miscellaneous	2.25 / 2.50
Repacked	2.75 / 3.00
Roofing Stock—	
Foreign No. 1	nominal
Domestic No. 1	1.85 / 1.90
Domestic No. 2	1.75 / 1.80
Roofing Bagging	1.65 / 1.70
Old Manila Rope	6.25 / 6.50

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1—	
Foreign	nominal
Domestic	4.75 / 5.25
No. 1 Clean Bright—	
Sisal Strings	.04½/ .05
No. 2 Clean Bright—	
Sisal Strings	.03½/ .04
Sisal Jute	.02¾/ .03
Scrap—	
No. 1	5.00 / 5.50
No. 2	2.50 / 3.00

WITH AMERICAN ANODE LATICES AND MIXES...

you can do—

- ★ Spraying
- ★ Spread Coating
- ★ Saturating
- ★ Brushing
- ★ Flotation Coating

you can get—

- ★ Greater Tear Strength
- ★ Greater Wet Strength
- ★ Grease Resistance
- ★ Abrasion Resistance
- ★ Water Resistance
- ★ Higher Tensile Strength
- ★ Elasticity
- ★ Improved Flexibility

THE creation of new papers . . . the improvement of established ones . . . the discovery of new uses for treated papers—these are the things American Anode latices are helping to bring about in the paper field. Don't assume that a problem cannot be solved with latex until you talk to American Anode development engineers. We make no finished paper products, but we are prepared to help on products you are making or wish to make. For information, please write Department AD-3, American Anode Inc., 60 Cherry Street, Akron, Ohio.

AMERICAN ANODE

CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS

Old Papers

Wool Tares, heavy ..	4.75	/ 5.00
New Burlap Cuttings	6.00	/ 6.50

(F. o. b. Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00/	$115.00
No. 1 Hard White Shavings, unruled .	100.00/	—
Soft White Shavings, One cut	90.00/	95.00
White Blank News .	75.00/	—
Soft White Shavings	80.00/	—
No. 1 White Ledger	85.00/	90.00
Ledger, Colored	70.00/	72.00
No. 1 Heavy Books & Magazines	24.00/	26.00
Overissue Magazines	nominal	
New Manila Envelope Cuttings	80.00/	—
No. 1 Assorted Old Kraft	60.00/	65.00
No. 1 Mixed Paper .	11.00/	12.00
Box Board Cuttings .	10.00/	11.00
Kraft Corrugated Cuttings	90.00/	100.00
Old Corrugated	24.00/	26.00
Overissue News	20.00/	22.00
No. 1 News	13.00/	15.00

BOSTON

Old Papers

(F. o. b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled .	6.25	/ 6.75
No. 1 Hard White Shavings, ruled ..	6.00	/ 6.50
Soft White Shavings, Misc.	6.00	/ 6.25
No. 1 Fly Leaf Shavings	—	/ —
No. 2 Fly Leaf Shavings	4.25	/ —
No. 1 Groundwood Fly Leaf Shavings	1.75	/ 2.00
No. 2 Groundwood Fly Leaf Shavings	1.50	/ 1.75
Mixed Colored Shavings	2.00	/ 2.25
New Manila Envelope Cuts, one cut	4.50	/ 4.75
Hard White Envelope Cuts, one cut	7.00	/ —
Triple Sorted No. 1 Brown Soft Kraft	3.75	/ 4.00
Mixed Kraft Env. & Bag Cuttings	4.00	/ 4.25
Kraft Envelope Cuttings	5.00	/ 5.50
No. 1 Heavy Books & Magazines	1.75	/ —
New Manila Envelope Cuttings, one cut .	—	/ —
New Manila Envelope Cutings	4.00	/ 4.25
White Tabulating Cards	5.00	/ —
Groundwood Tabulating Cards	1.50	/ 1.75
White Blank News .	2.25	/ 2.50
No. 1 Assorted Old Kraft	3.50	/ 4.00
No. 1 Mixed Paper .	.60	/ .65
Overissue News	.90	/ 1.00
No. 1 News	.70	/ .75
Box Board Cuttings .	.60	/ .70
New Corrugated Cuttings, Kraft	2.75	/ 3.00
Old Kraft Corrugated Containers ..	2.00	/ 2.25
Old Corrugated Containers	—	/ 1.10
Jute Corrugated Cuttings	1.07½/	—
Paper Strings	2.00	/ 2.25

Bagging

(F. o. b. Boston)

Gunny Bagging—		
Foreign	—	/ 4.75
Domestic	6.25	/ 6.50
Sisal Rope No. 1 ..	6.25	/ —
Sisal Rope, No. 2 ..	5.50	/ —
Mixed Rope	3.00	/ —
Mixed Strings	1.60	/ —
Transmision Rope—		
Foreign	nominal	
Domestic	3.00	/ 3.50
Manila Rope—		
Foreign	nominal	
Domestic	6.50	/ —
Soft Jute Rope	6.25	/ 6.50
Jute Carpet Threads	6.00	/ —
Bleachery Burlap	—	/ 7.00
Scrap Burlap—		
Foreign	6.00	/ 6.25
Domestic	6.00	/ 6.25
South America	6.00	/ 6.25
Wool Tares		
Foreign	6.25	/ —
Domestic	6.25	/ —
Austr. Wool Pouches	7.50	/ —
New Zealand Wool Pouches	7.50	/ —
New Burlap Cuttings	6.50	/ —
Heavy Baling Bagging	5.25	/ 5.75
Paper Mill Bagging .	5.50	/ 5.75
No. 1 Roofing Bagging	2.25	/ 2.50

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—		
New Light Prints .	.07½/	—
Fancy Percales ..	.08	/ —
New White No. 1 .	.11	/ .11¼
New Light Flannelettes	.08	/ .08½
Canton Flannels, Bleached	.10	/ .11
Underwear Cutters, Bleached	.11½/	—
Underwear Cutters, Unbleached	.11	/ .12
Silesias No. 1	.08	/ .08½
New Black Silesias .	.04½/	—
Red Cotton Cuttings	.05	/ —
Blue Overalls	—	/ .08½
Soft Unbleached	.11	/ .12
Blue Cheviots	.08½/	.09
Fancy	.06	/ —
Washable	.06	/ —
Khaki Cuttings	.06½/	.07¼
Corduroy	.03½/	—
Men's Corduroy	.04½/	—
Ladies' Corduroy	.04	/ —
Khaki Canvas	—	/ .06
B. V. D. Cuttings	.11½/	—

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—		
Repacked	3.80	/ —
Miscellaneous	3.20	/ —
White No. 2—		
Miscellaneous	2.65	/ —
Twos and Blues, Repacked	2.20	/ —
Old Blue Overalls ..	2.25	/ 2.50
Thirds and Blues, Repacked	2.20	/ —
Miscellaneous	1.80	/ —
Black Stockings	3.50	/ 4.00
Roofing Stock—		
No. 1	1.85	/ —
No. 2	1.75	/ —
No. 3	1.65	/ —
No. 4	1.65	/ —
No. 5, Quality A.	1.35	/ —
Quality B.	1.20	/ —
Quality C.	.95	/ —
Old Manila Rope	6.00	/ —

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)
Mill Prices, Baled

Shavings—		
No. 1 Hard White Envelope Cuts, one cut	$150.00/	—
No. 1 Hard White Shavings, runruled	140.00/	—
No. 1 Soft White Shavings	120.00/	—
No. 1 White Ledger .	85.00/	—
No. 1 Heavy Books & Magazines	35.00/	—
White Blank News .	80.00/	85.00
Mixed Kraft Env. & Bag Cuttings	90.00/	110.00
No. 1 Assorted Old Kraft	35.00/	—
Overissue News	24.00/	—
No. 1 News	21.00/	—
No. 1 Mixed Paper .	13.00/	—
Old Corrugated	26.00/	—
Mill Wrappers	17.00/	—

MARKETS

BLANC FIXE—Continued heavy demand. Prices firm. Pulp is currently quoted at $85 in bags, car lots at works, 6 cents per pound, l.c.l., deld.; by-product $75 per ton, car lots at works, 6 cents per pound, l.c.l., deld.

BLEACHING POWDER — Supply adequate. Delivery good. Prices range from $3.75 to $4 per 100 pound drums, l.c.l. works.

CASEIN—Domestic production well behind that of a year ago. Prices down two cents. Speculation weakens import market temporarily. Current prices on processed acid precipitated casein at 30 to 33 cents per pound for domestic grades and 28½ to 29½ cents for imported grades, f.o.b. shipping point.

CAUSTIC SODA — Demand heavy. Supply made extremely tight by extended strike. Solid caustic is reported at $2.85 per cwt.; flaked and ground is quoted at $3.25 per cwt. in 400 pound drums, $3.75 to $4 per cwt. in 100 pound drums—car lots at works; liquid 50 percent in tank cars at $2.25 per cwt.; liquid 73 percent in tank cars at $2.35 per cwt., at works.

CHINA CLAY—Domestic grades and imported in good supply. Filled is $9 to $11.50 per ton, car lots; coating clay is $14 to $22. Imported clay quotation, short tons, $16 to $35, export warehouse.

CHLORINE — Supply extremely tight. Production cut back by labor condition. Currently quoted at $2.25 per cwt. in single unit tank cars, at $2.55 to $3.75 per cwt., in multi-unit tank cars, f.o.b. works.

ROSIN—Supply good. Domestic buying spotty. U. S. Dept. of Agriculture backs request to remove export curbs. Gum rosin in drums per 100 pounds net in car lots, f.o.b. Savannah: B, $6.50; G, H, I, K, $6.76. Wood rosin per 100 pounds net, car lots, f.o.b. Savannah: B, $4.50 to $5; FF, $5.50 to $6.

ROSIN SIZE — Seventy percent, gum and pale wood grades. Supply ample. Demand good. Tank cars $5.75 to $6 f.o.b. southern shipping point.

SALT CAKE—Demand continues ahead of supply with slight improvement in shipments. Production under contract. Domestic salt cake is quoted at $25 to $28.

SODA ASH — Supply worsened by strike. Deliveries behind schedule. Current prices, car lots, per 100 pounds: in bulk, $1.10; in paper bags, $1.30; and in barrels, $1.70.

SODIUM BICARBONATE—Strong demand with supply somewhat tighter. Reported as $1.85 per cwt. paper bags, carload lots.

STARCH—Extremely heavy demand. Depleted supply. Deliveries somewhat behind. Export inquiry dull. Five cent rise in freight rates reflected in prices. Pearl grade quoted at $7.01 per 100 pounds; powdered starch at $7.12 per 100 pounds; car lots, New York.

SULPHATE OF ALUMINA—Prices unchanged. Supply steady. The commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is $2 per 100 pounds in bags, car lots, at works.

SULPHUR—Production shows heavy gain. Prices unchanged. Supplies ample. Annual contracts are quoted at $16 to $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf ports is $17.50 to $19.50 per long ton.

TALC—No change in domestic market. Demand far in excess of supply. Domestic grades are currently quoted at $23 per ton in paper sacks, f.o.b. mills; Canadian at $35 and up per ton. All prices in car lots.

TITANIUM DIOXIDE—Market unchanged. Extremely tight supply. No early easing seen in situation. Shipments on allocation. Anastase 17½c pound carload lots, 18-18½c l.c.l., rutile, 19½c pound carload lots, 20-20½ l.c.l.; 50-pound bags, f.o.b. plant, minimum freight allowance.

LIKE TO WORK PUZZLES, MR. SUPERINTENDENT?

If you say "No", we challenge you, for every mill superintendent is eternally working puzzles.

Puzzles pop up everywhere—in the beater room—in the machine room—in the converting plant. Things going wrong. Things to adjust, to replace.

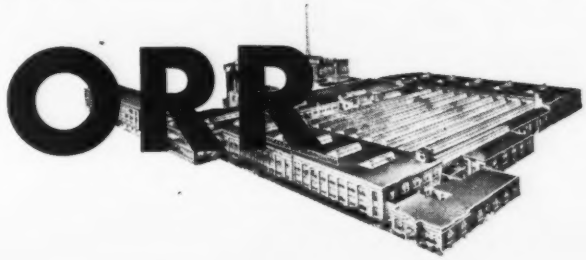
Take water. To you it is a belt to transport fiber. To you water poses problems in your Hydrapulpers, in your beaters, in your jordans, in your pumps, stock lines, and chests.

On the machine—and here is where felts come in—water removal concerns the surface tension of your felts, the pressure on them, their porosity, the speed you're running—those points and many more—each a truly scientific puzzle and ever crying for attention.

Felt manufacturing is, therefore, an art. And that's why Orr emphasizes the advantage of having an Orr representative suggest the particular kinds of felts your particular machine should have.

COMPLETE LINE OF WOOLEN FELTS: *STANDARD — untreated; ORR - CHEM — chemically - treated; COTTON WARP for cement and asbestos products.*

The Orr Felt & Blanket Co.
PIQUA, OHIO



FINANCE

Great Lakes Profit Up 62 Per Cent in First Quarter

TORONTO—Great Lakes Paper Company, Ltd., net profit for the first quarter of 1948 is up 62.6 percent from the corresponding period of 1947. Directors consider it unwise, however, to increase common dividends at present, President Earl Rowe told the meeting.

Working capital requirements are substantially greater than in the past, and the company is engaged in a $3 million renovation program. Directors are following a conservative dividend policy during this period of "so-called prosperity" in the same manner as they are providing reserves against a possible drop in inventory values, Mr. Rowe stated.

An agreement has been negotiated with Rhinelander Paper Company for construction of a new sulphite pulp digester, with annual production capacity of 10,000 tons. The contract provides for sale at satisfactory prices for the full output of the unit for 20 years, it was said. Full construction cost of this unit is being advanced by the Rhinelander Company.

A. G. Walwyn was elected a director.

National Container Sales And Profits Sag

LONG ISLAND CITY, N. Y. — Consolidated net sales of National Container Corporation and its subsidiaries for the period January 1 to March 31, 1948, amounted to $10,308,167.24 compared with $10,964,599.04 for the period January 1 to March 31, 1947. Consolidated net profit after all charges, including Federal taxes based on income, totaled $1,830,583.50 and $.69 per common share on 2,641,424 shares outstanding as at March 31, 1948, compared with $3,109,024.53 and $1.23 per common share for the period of January 1 to March 31, 1947, after adjusting for three for one split-up.

Puget Sound Profits Up

BELLINGHAM, Wash. — First-quarter operations of Puget Sound Pulp & Timber Co. yielded a net profit of $1,592,624, equal to 4.09 a share on 389,094 shares of common stock outstanding. In the first quarter of 1947, operating profit amounted to $947,393, or $2.79 a share on 333,867 shares of common stock, after provision for dividend on 49,810 preferred shares then outstanding, and net capital gain of $131,218 produced 39 cents a share additional, making $3.18 per common share for that period.

Operating at capacity, 32,249 tons of pulp were produced in the first quarter of 1948. From sulphite waste liquor discharged from the pulp mill, 708,564 gallons of industrial alcohol were produced. Utilizing waste heat from the alcohol operation and waste liquor after alcohol extraction, 256,904 gallons of liquid and 997 tons of dry Lignosite were made. Lignosite is a new construction material, used as a hardening agent and binder and in other ways, production of which as a pulp mill by-product began in November 1947.

Net sales and other income totaled $5,137,922 in the first quarter of 1948, against $3,157,821 a year ago. Profit before provision for Federal tax on income amounted to $2,568,749 in the 1948 period, in comparison with $1,528,036 in 1947. Provision for Federal tax amounted to $976,125 on 1948 income, against $580,644 on earnings of the first quarter of 1947.

Johnson Preaches Safety To Neenah Rotary

NEENAH, Wis.—Al Johnson, safety director of Kimberly-Clark Corporation and president of the Twin City Safety Council, spoke May 13 on safety before the Neenah Rotary club. He asserted that Wisconsin's accident record has been growing worse in the last two years, except for industry.

Of the 100,000 persons killed yearly in accidents, 83,000 die outside of the industrial field, he asserted, added that automobile manufacturers cannot be blamed for fatal highway accidents, since 85 percent of the fatalities are caused by excessive speed, reckless driving and traveling on the wrong side of the road.

He also distributed charts of the expanded Twin City Safety Council organization, and urged Rotary to "get safety ideas and put them across."

Paper and Printing Dividends Gaining

WASHINGTON, D. C. — Publicly reported dividend payments for the paper and printing industries for April, 1948, showed a combined total of $10,100,000, compared with $9,000,000 in the same month last year, the Department of Commerce reported this week. For the three months ending with April, 1948, payments totaled $30,100,000, compared with $26,200,000 in the same months a year ago.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending May 15, 1948

STOCKS

	High	Low	Last
A. P. W.	5⅞	5⅜	5⅜
Armstrong Cork Co.	53¾	51¼	53⅜
Armstrong Cork Co., 4 pf. 4	112¾	111½	112½
Armstrong Cork Co., pf. 3¾	97¾	96	97¾
Celotex Corp.	30	27¾	30
Celotex Corp., pf.	18¾	18⅜	18¾
Certain-Teed Products Corp.	18⅞	16⅛	18¾
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	24	22⅜	24
Champion Paper & Fibre Co., pf.	98	97½	98
Congoleum Nairn Co.	34½	32	34½
Container Corp. of America	38¾	37⅜	38½
Container Corp. of America, pf.	99	99	99
Crown Zellerbach Co.	34½	31⅜	34½
Crown Zellerbach Co., pf. 4.20	102¾	100	100
Crown Zellerbach Co., 4 pf. 4	124¾	117	124¾
Dixie Cup Co.	38½	37	38½
Dixie Cup Co., A	53	52	53
Flintkote Co.	40¼	36⅜	39⅛
Flintkote Co., pf.	100½	99⅞	100½
Robert Gair	9½	8⅜	9⅜
Robert Gair, pf.	19¼	19¼	19¼
International Paper Co.	61⅜	57½	60⅜
International Paper Co., pf.	96½	96½	96⅜
Johns-Manville Corp.	42	38½	42
Johns-Manville Corp., pf.	111½	109	109⅛
Kimberly-Clark Corp.	23	20⅞	23
Kimberly-Clark Corp., pf.	100	99¼	99½
Mac Andrews & Forbes	37	36¾	37
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	23¼	22	23¼
Mead Corp.	21⅜	19¾	21
Mead Corp., pf. 4¼	93¼	93¼	93½
Mead Corp., pf. 2	43	43	43
National Container Corp.	13	12	13
Paraffine Companies, Inc.	25½	24¼	25½
Paraffine Companies, Inc., pf.	103	103	103
Rayonier, Inc.	32½	30	31⅜
Rayonier, Inc., pf.	34½	34	34½
Ruberoid Co.	68	63¾	67
St. Regis Paper Co.	12⅜	10¾	12⅛
St. Regis Paper Co., pf.	91	89	91
Scott Paper Co.	49	46	49
Scott Paper Co., pf.	94	93½	94
Sutherland Paper Co.	41	40	40⅞
Union Bag & Paper Corp.	37	35⅛	36⅜
United Board & Carton	14⅜	12¾	14
U. S. Gypsum Co.	104	99	104
U. S. Gypsum Co., pf.	....	....	....
United Wallpaper	5⅜	4¼	5⅛
United Wallpaper, pf.	32¼	30¼	32½
West Virginia Pulp & Paper Co.	48¾	46	48⅜
West Virginia Pulp & Paper Co., pf.	106	105¼	106

BONDS

Celotex Corp., 3½s '60	100	100	100
Certain-Teed Products Corp., 5½s '53	....	....	....
Champion Paper & Fibre Co., 3s '65	99	99	99

New York Curb Exchange

High, Low and Last for Week Ending May 15, 1948

STOCKS

	High	Low	Last
American Writing Paper Corp.	7	6¾	7
Great Northern Paper Co.	42½	42	42½
Taggart Corp.	11½	11⅜	11½

Trends

(Continued from page 18)

Paper production for the week ended May 8 was estimated at 103.3 percent, compared with 103.5 for the preceding week, with 107.9 for the corresponding week of 1947, with 102.8 for 1946, and with 85.4 for the corresponding week of 1945. (This does not include mills producing newsprint exclusively.) Tonnage production was 8.5 percent greater than last year's although because of 13.3 percent increase in 1948 capacity this year's production ratio is lower.

Paperboard production for the week ended May 8 was 101.0 percent of capacity, compared with 102.0 percent for the preceding week, with 101.0 for the corresponding week of 1947, with 102.8 for 1946, and with 94.0 for 1945.

Deferiet Receives Spring's First Cargo

WATERTOWN, N. Y.—The first pulpwood consignment of the season from Canadian timberlands has arrived at the St. Regis Paper Company mill at Deferiet, H. V. Hart, woodlands manager of the St. Regis company, reported last week.

The shipment, the first of a total of 47 loads planned before the closing of navigation in the fall, arrived aboard the steamer Southcliff Hall which made her maiden voyage. The ship, owned by the George Hall Corporation of Ogdensburg, was built last winter and is the newest vessel to join the eleven ship fleet of lake carriers operated by the corporation. The Ogdensburg firm has been shipping St. Regis pulp wood over the lake route for more than 20 years.

Mr. Hart said that about 1,400 cords of pulp wood was brought in by the Southcliff Hall, and that during the summer 65,000 cords would be shipped via lake ships and rail to the Deferiet mill. The number of cords to be handled this summer is not a record, Mr. Hart said, but it is substantially larger than any received in recent years, exceeding by more than 18,000 cords the amount imported in 1947.

The shipments will be taken aboard the lake carriers at Richibucto, New Brunswick, and Godbout, P. Q., and after being loaded on railroad cars at Waddington, will be shipped via the Norwood and St. Lawrence railroad to Norwood and thence through Watertown to Carthage by the New York Central. From Carthage, the cars will be hauled to the Deferiet mill over a spur line owned by the St. Regis Company.

The schedule of operations this summer, Mr. Hart said, calls for 17 loads from Richibucto, and 35 from the St. Regis interests along the St. Lawrence serviced by the port of Godbout.

From this Mississippi River shipping terminal of Freeport Sulphur Company at Port Sulphur, Louisiana, Sulphur is shipped to Industry.

One of a series of Stories on Sulphur

BY RAIL and by water Sulphur shipments leave Gulf Coast ports bound for market. Where is the market for Sulphur? Everywhere we look around us. A hundred times a day we touch and use food, materials and articles in which Sulphur has played a part. Sulphur's markets are the countless industries which need its help.

THESE industries make use of the chemical properties of Sulphur to supply us with such products as rubber, paper, fertilizer, chemicals, rayon, petroleum products, steel, dyes, paints, explosives and textiles. And these are only a few of the products in which Sulphur is a key factor.

SOMETIMES Sulphur is used just as it comes from the mines. Often it is converted into Sulphur Dioxide or Sulphuric Acid before it goes to work. Usually its service is performed behind the scenes at some stage in the process and Sulphur does not appear in the final products—the products we buy in the stores.

FREEPORT SULPHUR COMPANY

OFFICES: 122 East 42nd Street, New York 17, N. Y.

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HYCAR latex added directly to the pulp in the beater or head box, or used as an impregnant for paper, imparts valuable properties not otherwise readily obtained.

Tear and wet strength are considerably increased. Resistance to oils, solvents and chemicals is obtained, with retention of good aging properties. The addition of Hycar also insures excellent flex life and scuff resistance, and in thick papers prevents separation of the laminations.

Thus, better physical properties may be obtained in high grade pulp. In other cases the use of lower grade stock may be permitted because of improved physical properties obtained by the use of Hycar latex. Paper is made adaptable to fields where it is not now used.

Present and potential applications for papers of this sort range from wallpaper to insoles, from gaskets to leather replacement material, from shelf liners to packaging papers.

HYCAR latex is very easy to use. In most applications no vulcanization is required. Normal drying times are used. And HYCAR latex is an inherently safe material to handle. *No solvent system is needed.*

We would be glad to work with you on any problems relating to the use of HYCAR latex. For more information, please write Department HJ-6, B. F. Goodrich Chemical Company, Rose Buildin Cleveland 15, Ohio.

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Concentration of White Water Sludges*

II. Physical and Chemical Methods

By Willem Rudolfs and A. J. Palladino[1]

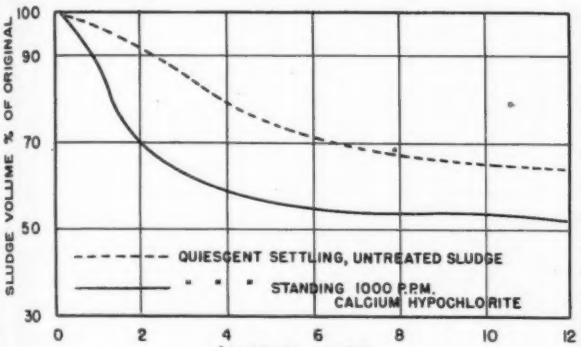

FIG. 1

Concentration Rate of Sludge Caused by Flotation with Calcium Hypochlorite vs. Plain Settling

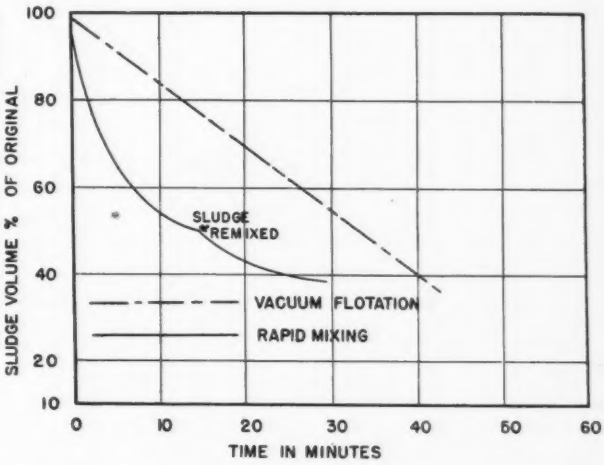

FIG. 2

Concentration Rates of Sludge Effected by Supersaturation with Air, by Rapid Mixing, and by Vacuum Flotation

In a previous paper (1) it was indicated that gases entrained in sludge impede settling and may cause flotation. To make maximum use of flotation phenomena, chemicals are required. Chemical coagulants aid floc formation, and the buoyant effect of entrained gases aids in the concentration of sludge at the surface of the liquid.

This paper records the effects of coagulants and pH on the concentration of white water sludge by flotation, inducing flotation by supersaturation and evacuation, and results obtained by vacuum filtration.

Experimental Procedures

Flotation was accomplished using calcium hypochlorite; by means of supersaturation with air using a high-speed mixer; and by evacuation. The vacuum filtration tests were accomplished with a 16 sq. in. experimental filter leaf covered by nylon filter cloth under a vacuum equivalent to 25 inches of mercury.

Analyses of the sludge characteristics included pH, total, suspended and dissolved solids content and ash, and in some cases, acidity and alkalinity. In some cases, turbidities of effluents from the various processes were determined. These were determined by use of an electrophotometer, which had been calibrated against the Jackson Candle Turbidimeter.

Concentration by flotation induced by supersaturation with air was accomplished by high speed mixing in a Waring Blender for three minutes. Samples, thus concentrated, were allowed to stand quiescently from 15 minutes to one hour.

In the vacuum filtration tests the cycle of operation consisted of 60 second immersion of the filter leaf in the sample, meanwhile keeping the sample well mixed, and a 60 second period in which the vacuum usually dropped off from 25 inches of mercury to 15 inches. The filter cakes thus produced were blown off with compressed air and the moisture contents and thicknesses of the cakes determined. Also, the volume and turbidity of the filtrates were measured.

The white water sludges were obtained from different paperboard mills by coagulation of white water or from plant recovery units, and from watery sludge collected at a tissue mill. The sludge characteristics were presented in a previous paper (1).

* Paper of the Journal Series, New Jersey Agricultural Experiment Station, Rutgers University, Department of Sanitation.

[1] Chairman and Research Assistant, Rutgers University, New Brunswick, N. J.

INDUSTRIAL DEVELOPMENT

Paper Trade Journal, in this new section, proposes to make space available for discussion of administration and operational problems of the pulp and paper industry, as well as for the presentation of independent studies and research on technical and engineering subjects. Noteworthy features of paper mills, converting plants, associated industries and institutions also will be presented, as they become available. These pages will be open to all who are qualified to discuss subjects within these limits. Manuscripts, submitted for approval, will be welcomed.—E. P. McGINN, Industrial Editor.

Effect of Coagulants and pH

Doses of 5 lbs./1000 gallons of $Fe_2(SO_4)_3$, Fe Cl_3, lime and alum were added to samples of sludge. This sludge was originally collected from white water treated with alum and activated silica. No attempt was made to adjust the pH value. The samples were flash mixed after coagulant addition and allowed to settle quiescently. Since the pH of this sludge was low, indicating the applicability of a basic rather than an acidic coagulant, lime in doses ranging from 3.5 to 180 lbs./1000 gallons was flash mixed with samples of this sludge and the sludge volume recorded on quiescent settling. Doses of 20 lbs./1000 gallon of Fe Cl_3 were added to samples of sludge and adjusted in two unit increments from pH 2 to pH 12. Lime in doses ranging from 7 to 360 lbs./1000 gallons was added to sludge produced by alum treatment. Four other types of sludge were adjusted to pH values ranging from pH 2 to 12. In all tests sludge volume readings were taken up to 48 hours.

Little additional reduction in sludge volume over and above that produced by plain settling alone was attained by coagulation of sludge at doses of 5 lbs./1000 gallons of $Fe_2(SO_4)_3$, Fe Cl_3, lime and alum. The effectiveness of lime at higher concentrations is shown in Table I. A 29% sludge volume reduction was attained in 1 hour with a lime dose of 180 lbs./1000 gals. Doses below this amount resulted in no advantage over that attained by plain settling and in some cases resulted in larger sludge volumes. Doses of 20 lbs./1000 gallons of Fe Cl_3 caused no increase in concentration rates. The effect of lime was similar to the effect of this coagulant.

The effect of pH on sludge volume production was small, an amount exceeding 5% being attainable only at extreme pH values and after 6 hours' settling time. As an illustration, the effect of pH on one sludge is shown in Table II.

TABLE I.—EFFECT OF LIME ON SLUDGE VOLUME REDUCTION

Time, hr.	Lime Dose Lbs./1000 Gallons					
	3 6	7.2	14.4	36	180	0 (Control)
0	100	100	100	100	100	100
0.5	97	94	97	94	80	97
1	90	87	96	85	60	89
2	85	85	97	83	55	82
18	77	77	96	78	51	69
50	73	74	85	76	50	65

Figures represent sludge vol.—% of original

TABLE II.—EFFECT OF pH ON SLUDGE VOLUME REDUCTION OF SLUDGE

Time, hr.	pH						
	2	4	*5	6	8	10	12
0	100	100	100	100	100	100	100
0.5	93	90	93	94	93	92	91
1	89	85	90	90	89	89	87
3	72	73	79	80	80	85	82
6	66	71	75	77	77	85	80
22	64	68	73	73	72	82	78
54	62	67	72	67	72	81	76

Figures represent sludge vol.—% of original

* Control.

TABLE III.—RESULTS OF RAPID-MIX FLOTATION PROCESS

Hypochlorite Dose p.p.m.			Final [1] Conc.	Sus. Solids p.p.m. Subnatant Liquor
Before Mixing	After Mixing	pH		
0	0	6.9	1.98	620
1000	....	6.9	1.82	580
....	1000	6.9	2.00	400
1000	....	6.0	1.92	520
....	1000	6.0	1.80	420
....	1000	5.0	2.26	480
5000	....	5.0	0.45	....
....	5000	5.0	2.59	200
0*	....	6.9	2.38	960
3000*	....	6.9	1.73	280
....	3000*	6.9	2.48	460

Sludge—original concentration = 0.45% solids

* Sludge concentrated by settling to 0.90% solids before rapid mixing.
[1] Final concentration in % solids—measured after 15 minutes standing.

TABLE IV.—EFFECT OF FILTER AIDS ON VACUUM FILTRATION RATE

Filter Aid	Filter Rate,* gal./sq. ft./hr.	Computed Fiber Removed, lb./sq. ft./hr.	Filter Cake		Computed Lb. Water/ Lb. Fiber Removed
			Thickness**	Per Cent Moisture	
None	14.4	1.68	1/32	79	3.8
Celite 512	20.2	2.35	1/8	70	4.7
Celite 503	25.0	2.91	1/8	69	4.5
Hyflo super cel	26.4	3.10	1/8	69	4.5
Celite 545	29.4	3.42	3/16	69	4.5
Lime	31.2	3.65	3/16	69	4.5

Paper tissue sludge concentration = 1.4%
Filter aid dose equal to sludge concentration in each case

* Based on a 2 minute operating cycle.
** Thickness in inches.

TABLE V.—EFFECT OF VARIOUS CONCENTRATIONS OF CELITE 545 AND LIME ON THE VACUUM FILTRATION OF SLUDGE

Filter Aid Dose [1]	Filtration Rate,[2] gal./sq. ft./hr.		Computed Fiber Removed, lb./sq. ft./hr.		Filter Cake				pH Lime
					Thickness [3]		Per Cent Moisture		
	545	lime	545	lime	545	lime	545	lime	
0	15.0		1.95		1/32		81		....
5	16.8	26.4	2.18	3.43	1/32	1/8	78	79	11.3
15		30.6		4.00		1/8		78	11.9
25	17.1	29.4	2.22	3.82	1/32	1/8	76	77	12.0
50	19.8	30.0	2.58	3.90	1/16	1/8	71	75	12.1
75	19.2		2.50		1/8		71		
100	23.7	30.6	3.08	4.00	1/8	3/16	68	72	12.2
150	29.1		3.78		1/4		67		
200	35.2		4.57		1/4		67		

[1] Filter aid dose in % sludge solids.
[2] Based on a 2 minute operating cycle.
[3] Thickness in inches.

Concentration by Flotation

Flotation processes in general require flocculation of the sludge particles and attachment of gas bubbles to the flocculated particles to cause flotation. Some types of save-all equipment concentrate fibre from white water by use of flotation processes. The Sveen-Pederson and the Dorr ADKA save-alls are two save-alls of this type. Both of these processes involve saturation of the white water with air and subsequent release of air bubbles at a lower pressure. Chemicals are added to produce flocculation.

Flotation processes are particularly effective with sludges that settle very slowly. Hence, a great part of the experimentation with this technique was performed with sludge representing that portion of the white water which was discharged from the cloudy-port of a vacuum filter save-all, consisting of fibres of small particle size. The

TABLE VI.—DECREASE OF VACUUM FILTRATION RATE. NO WASHING OF FILTER CLOTH BETWEEN CYCLES

Cycle *	Filtration Rate,* gal./sq. ft./hr.	Filter Cake		Effluent Turbidity, p.p.m.
		Thickness, in.	Moisture, %	
1	20.4	1/16	71	340
2	17.1	1/16	70	....
3	17.1	1/16	70	....
4	13.8	1/16	70	....
5	13.5	1/16	69	....
6	15.3	1/16	69	....
7	14.7	1/16	70	200
8	16.2	1/8	70	150
9	13.0	1/8	69	....
10	12.0	1/8	69	....
11	12.0	1/8	69	....
12	11.4	1/8	69	140

Filter aid dose 50% of sludge solids

* Based on a 2 minute operating cycle.

TABLE VII.—EFFECT OF DIATOMACEOUS FILTER AID ON THE VACUUM FILTRATION RATE OF SLUDGE

Filter Aid *	Filtration Rate, gal./sq. ft./hr.	Filter Cake	
		Inches	% Moisture
None	38.8	1/16	76.5
Filter cel	36.3	1/16	72.0
Celite 545	39.3	3/32	64.0

Concentration of sludge = 1% solids

* Filter aid dose equal to sludge solids concentration.

sludge had a gel-like appearance and concentrated only slightly on standing. Flotation tests were also conducted on sludges from other paperboard mills. The evolution of gas bubbles from calcium hypochlorite in solution has been known to affect flotation of solids from sludge slurries. Rudolfs (2) has shown the adaptability of this chemical as a flotation agent for activated sludge.

Use of Calcium Hypochlorite

Doses of calcium hypochlorite ranging from 50 ppm to 1000 ppm were added in a dry state to samples of sludge and the sludge volumes recorded up to 24 hours. Also, 20,000 ppm doses were added to samples of this sludge with pH adjusted from 5 to 1.

Maximum sludge volume reductions attained by flotation with 1000 ppm calcium hypochlorite were 15% in 1 hour, 40% in 4 hours and 50% in 24 hours. With 500 ppm doses of this chemical the sludge volume reductions equalled one-half of those above, and doses below 500 ppm yielded small and erratic results. Fig. 1 illustrates the advantage gained by flotation with 1000 ppm of calcium hypochlorite over that attainable by plain settling.

Sludge volume reductions resulting from 20,000 ppm doses did not exceed 20% sludge volume reduction in one hour and tended to be slightly higher at the lower pH values.

Supersaturation with Air by High Speed Mixing

Supersaturation was attained by aerating sludge samples in a high speed mixer. On quiescent settling after mixing, concentration by flotation took place as the tiny air bubbles came out of solution.

Twenty tests were conducted on portions of the same sludge. These samples were mixed for 3 minutes and were then allowed to concentrate by flotation for 15 minutes to 1 hour. In some cases, the sludge obtained after 15 minutes was remixed for three minutes and allowed to concentrate an additional 15 minutes. Thirteen of these samples were adjusted to pH 6 before mixing, and 100 ppm and 1000 ppm doses of calcium hypochlorite were subsequently added: In six cases the calcium hypochlorite was added before mixing and in seven cases after mixing of the sludges.

The same technique was applied to a total of twelve samples of another sludge. In eight of these tests, calcium hypochlorite in doses ranging from 1000 to 5000 ppm on a wet basis was added. Adjustments of pH to 5.0 and 6.0 were made coincident with chemical addition. Since this sludge concentrated by plain settling, flotation tests were conducted on samples twice concentrated by settling. The samples were allowed to stand quiescently for a 15 minute period, after which the sludge volumes were recorded and samples of the sludge and subnatant liquor taken from total solids and suspended solids determinations.

Supersaturation with air followed by quiescent standing effected by flotation in the case of sludge which failed to concentrate on quiescent settling, showed a 35% average sludge volume reduction in 5 minutes, 50% in 15 minutes and 55% in one hour.

The turbidity of the effluent varied from 400 to 600 ppm. When the subnatant liquor was drained off after 15 minutes and the resulting sludge remixed rapidly, a total sludge volume reduction of 60-65% was accomplished after an additional 15 minute period of standing. The sludge resulting from this latter process had a solids concentration of about 2.5% and would not appreciably concentrate further upon being mixed once again. Thus, a 2.8 fold increase in concentration was accomplished, since the original concentration of sludge was 0.89%. A small increase in concentration was effected by 100 ppm hypochlorite doses. Greatest concentration occurred when the hypochlorite was added before mixing, but the turbidity of the subnatant liquor was least (100-150) when the chemical was added after mixing. Addition of 1000 ppm hypochlorite doses were no more effective than 100 ppm doses. The concentration by flotation effected only by high speed mixing of sludge is shown in Fig. 2.

The results attained by rapid mix flotation of sludge which is more readily concentrated by settling are shown in Table III. This sludge had an initial consistency of 0.45%. A 4.4 fold increase in concentration was attained in 15 minutes with the unaltered sludge. When the sludge was concentrated to twice its original consistency by 2 hours' settling before subjection to the flotation process, a 5.3 fold overall increase in sludge concentration was attained. However, the suspended solids concentration of the subnatant liquor was higher than that of the unaltered sludge.

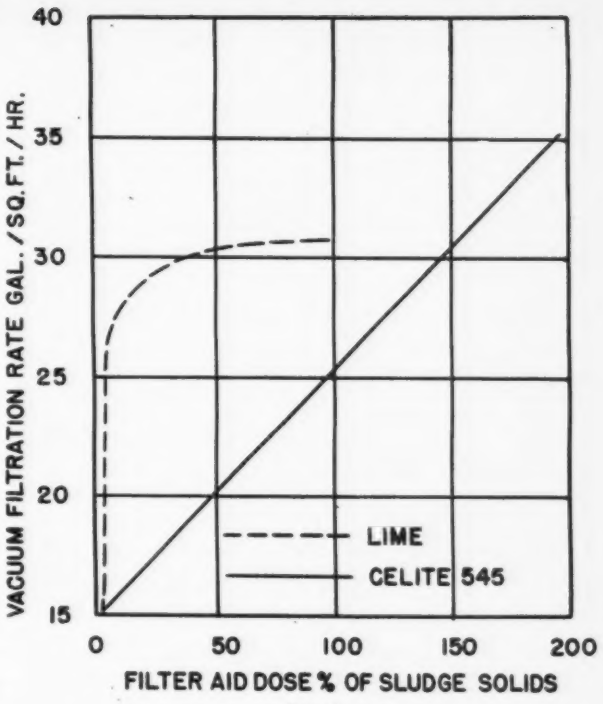

FIG. 3
Effect of Various Concentrations of Lime and Celite 545 on the Vacuum Filtration Rates of Paperboard Sludge

TABLE VIII.—EFFECT OF CONCENTRATION ON THE VACUUM FILTRATION RATE OF SLUDGE

Sludge Conc., %	Filtration Rate,* gal./sq. ft./hr.	Filter Cake, inches	Computed Solids Removed, lb./sq. ft./hr.
0.89	27.3	1/64	1.85
1.3	22.2	1/32	2.40
2.0	20.1	3/32	3.35

5,000 p.p.m. lime added as coagulant in each case

* Based on a 2 minute operating cycle.

TABLE IX.—EFFECT OF ALUM ON THE VACUUM FILTRATION OF SLUDGE CONCENTRATED BY FLOTATION TO 3.0% SOLIDS

Alum Dose,* p.p.m.	Filtration Rate,** gal./sq. ft./hr.	Filter Cake		Computed Solids Removed, lb./sq. ft./hr.	Effluent, pH
		Inches	% Moisture		
None	16.5	1/16	78	4.05	8.3
75	19.5	3/32	75	4.88	8.2
150	22.2	3/32	75	5.55	7.7

* Alum dose in terms of Al.
** Based on a 2 minute operating cycle.

The efficiency of this process was increased by use of calcium hypochlorite as a flotation aid and coincident pH adjustments to 6.0 and 5.0. Better results were obtained when the hypochlorite was added after the rapid mix rather than before. Best results were obtained with pH adjustment to 5.0 and a hypochlorite dosage of 5000 ppm, in which case, flotation yielded a sludge of 2.59% consistency and a subnatant liquor to 200 ppm suspended solids.

Because of expansion from air bubbles and froth, the sludge volume immediately after beating expanded on the average of 12% of original volume; however, in no case was there more than 10% expansion after 15 minutes' flotation.

Inducing Flotation by Evacuation of Air

An attempt was made to induce flotation by supersaturation with air, using three minutes of rapid mixing followed by application of a vacuum ranging from 5 to 25 inches of mercury.

This process, if carefully controlled by increasing the vacuum slowly from 5 to 25 inches of mercury, was found to be effective in reducing the sludge volumes by 67% in ½ to ¾ hour. However, results were not readily reproducible. The maximum concentration rate of sludge produced by vacuum flotation is compared to that produced by rapid mix flotation in Fig. 2.

Vacuum Filtration

In the vacuum filtration of waste sludges some conditioning chemical is usually added to effect coagulation before filtration. This increases the filtration rate because of decreased clogging of the pores of the filter cloth. Another measure which aids in filtration is the addition of inert material to the sludge prior to filtration. This conditioning process causes a more granular sludge mixture, thus increasing the filtration rate and resulting in a drier, more easily handled filter cake. Both of these techniques were used to aid in the vacuum filtration of paper tissue and paperboard sludges in this work. Lime and alum, and various types of diatomaceous earth were used, the former as coagulants and the latter as inert filter aids. Diatomaceous earth has particular applicability in the recovery of paper fibre for reuse since it can be incorporated into the paper sheet as a filler material and thus effect a partial return of the recovery cost.

In vacuum filtration tests with sludge of 5% solids from paper deinking wastes, Eldridge (3) obtained rates of 5 gal./sq.ft./hr., corresponding to a solids removal of 2.8 lbs./sq.ft./hr., and a filter cake of 60% moisture and ⅛ inch thickness. He used 6 lbs./1000 gal. of lime as preconditioner. Filter cakes of 60% moisture are reported also by the National Council for Stream Improvement Inc (4) in tests on deinking waste sludges. This sludge contains about 20% fibre. White water sludge has an apparent fibre content of 80%.

(a) *Sludge from tissue.* In order to determine the filter aid most beneficial to the vacuum filtration of sludge from a tissue mill, the following filter aids were added in doses equal to the solids concentration of the sludge (1.4%); Johns-Manville diatomaceous filter aids: —hyflo super cel, Celite 503, Celite 512, and Celite 545. These are in order of increasing particle size from 1-12 microns to 12-45 microns.

Subsequently, lime and Celite 545 were added in graduated doses ranging from 5 to 200% of the sludge solids concentration. The sludge samples were well mixed to assure even distribution of filter aid and were then submitted to vacuum filtration. To assure that the porosity of the cloth remained constant, it was washed between tests until it passed 600cc of clean water in 5 seconds.

A subsequent test was conducted to determine the number of cycles which could be accomplished before it became necessary to wash the filter cloth. In this test, sludge to which Celite 545 in amount equal to 50% of the sludge solids had been added, was utilized. This sludge mixture was used also to determine the effect of precoating the filter cloth with diatomaceous filter aid. Precoat doses ranged from 1/16 to 1/2 lbs./sq.ft. This yielded a precoating 1/8 to 3/16 inch thick.

(b) *Sludges from Paperboard Mills.* The influence of filter cel and Celite 545, the finest and coarsest grades of J-M diatomite filter aids on the vacuum filtration rate of sludge, and the effect of alum and lime on sludges were also determined.

Some results obtained on the effect of filter aids on vacuum filtration (Table IV) indicate that, of the filter aids used, Celite 545 and lime were most effective in increasing the vacuum filtration rate of sludge from tissue. Based on the two minute cycle rates, filtration rates of about 30 gal./sq.ft./hr. were attained. The corresponding weight of solids removed computed from the filtration rates and the sludge solids concentration was about 3.5 lbs./sq.ft./hr. exclusive of filter aid weight. The actual solids removal varied somewhat from the computed values.

The moisture content in the filter cakes obtained by use of filter aids was about 70% compared to 80% when no filter aids were used. However, the weight of water per unit weight of sludge solids removed was lower in the cake when no filter aid was used. These values were computed from the moisture content of the filter cakes on the assumption that the ratio of sludge solids to filter aid in the cake was 1 to 1. This is probably valid, since the sludge mixture submitted to filtration contained sludge solids and filter aid in equal amounts. The cake thicknesses were ⅛ inch or greater when filter aid was used and were easily blown free of the cloth with compressed air.

The results of the tests comparing the effectiveness of various concentrations of lime and Celite 545, found to be the best filter aids of those previously studied, are depicted in Table V. A 15% lime dose resulted in a filtration rate of 30 gal./sq.ft./hr. Higher lime doses caused no increase in this rate. With Celite 545, however, the filtration rate was directly proportionally to dosage and it required a dose equal to 150% of the sludge solids to result in a filtration rate of 30 gal./sq.ft./hr. Up to a dose of 100% of the sludge solids concentration, lime yielded a higher filtration rate and a thicker cake of slightly higher moisture content than Celite 545. However, the pH of the effluents from lime treatment was above 11 with doses of 5% or higher. Fig. 3 illustrates the filtration rates attained with varying quantities of lime and Celite 545.

The results of the test to determine the number of cycles which could be accomplished before washing of the filter cloth was necessary when diatomaceous earth was used as filter aid are shown in Table VI. Eight cycles were accomplished before the filtration rate dropped significantly below 15 gal./sq.ft./hr. from the initial value of 20.4 gal./sq.ft./hr. Therefore, a 15 minute backwashing interval seems adequate for maintenance of satisfactory filtration rates.

Use of a precoat of ¼ to ½ lbs./sq.ft. of diatomite filter aid caused an increase of 10-20% in the filtration rate of the above sludge mixture, with turbidities in the effluent varying from 60 to 100 ppm and moisture in the

cake practically similar to those in the cake without diatomaceous earth.

Vacuum Filtration of Paperboard Sludges

The results obtained with diatomaceous earth as a filter aid for paperboard sludges are illustrated in Table VII. They indicate that the filtration rate of sludge was not affected by diatomite filter aids.

Filtration tests on sludge of 0.80% solids with lime added as a coagulant in graduated doses ranging from 100 to 10,000 ppm failed to produce a filter cake greater in thickness than 1/64 inch. This sludge was subsequently concentrated to 1.3% by 2 hours' plain settling and to 2.0% by flotation. The results of filtration tests following addition of 5000 ppm lime to these consistencies, summarized in Table VIII, indicate that the filtration rate droped off at the higher consistencies, but the weight of solids deposited in the cake increased with increasing solids concentration. Also, a concentration of 2% was necessary to produce a filter cake of thicknesses approaching ⅛ inch. Lime doses below 5000 ppm were ineffective with with 2% sludge in producing a cake of thickness approaching ⅛ inch. A filtration rate of 20 gal./sq.ft./hr. corresponding to a solids removal of 3.3 lbs./sq.ft/hr. was obtained with lime doses of 5000 pm (25% of the sludge solids concentration.)

The results of vacuum filtration of sludge concentrated by flotation to 3.0% solids and coagulated with small alum preconditioning doses are shown in Table IX. An alum dose of 150 ppm effected a filtration rate of 22 gal./sq.ft./hr. corresponding to a solids removal of 5.5 lbs./sq.ft./hr. This represented a 35% increase in filtration over that attained with no coagulant. Coagulant addition was necessary to produce a cake approaching ⅛ inch in thickness.

Discussion

Flocculation, addition of coagulant and pH adjustment were found to have negligible effects on the concentration by settling of white water sludges. These results are similar to those of experiments with activated sludge, showing that stirring had only a very slight effect on the concentration rate. Addition of coagulating agents to activated sludge may cause a voluminous sludge and in small doses may actually increase the sludge volume.

Flotation of white water sludge was found to be most effective when accomplished by air bubbles rising out of solution following the supersaturation process. Use of calcium hypochlorite in connection with this method of sludge concentration increased the efficiency of the process by virtue of a more prolonged evolution of bubbles of gas. Theoretically, the reaction which occurs upon addition of hypochlorite is as follows:—In water, the hypochlorite releases chlorine gas which reacts with the water to form HCl and HOCl (hypochlorite acid). The HOCl then reacts with the water to form additional HCl and to release nascent oxygen in an effervescence of bubbles. It was found in this investigation that this reaction would occur when the sludge was adjusted to pH values below 7. At pH values of 5 to 6 the reaction resulted in a prolonged evolution of tiny bubbles which resulted in additional concentration by flotation and reduced the turbidity of the subnatant liquor by attaching to some of the finer sludge particles.

The combination of air supersaturation and calcium hypochlorite effected concentrations of both paper tissue and paperboard sludges to about 2.5% solids concentration. Calcium hypochlorite contributed to the concentration of paperboard sludges to a greater degree than in the case of paper tissue sludges.

It was necessary in achieving supersaturation by high speed mixing that a substantial vortex be formed so that entrainment of air might be considerable. Except in those cases of paper mills maintaining high speed beaters for treating of wood pulp, the achievement of supersaturation with air by high speed mixing is rather impractical. However, supersaturation can be accomplished by other means. The Sveen-Pederson and ADKA save-alls which recover fibre by supersaturating with air and flotation of solids from white water, should be effective also in thickening sludge.

The vacuum flotation technique, which depends for effect on the release of air bubbles due to reduced pressure, could not be made to produce reproducible results. This process has been used for the flotation of cannery wastes. However, it was found that vertical counter currents were frequently formed which hindered effective concentration.

Based on the two minute cycle employed in the vacuum filtration tests, a filtration rate of 30 gal./sq. ft./hr was attained with paper tissue sludge of 1.4% solids when lime was added as a coagulant in a dosage equal to 15% of the sludge solids weight (2100 ppm on a wet basis). This corresponded to a computed solids removal of 4 lbs./sq.ft/hr. It required about ten times as much Celite 545 to accomplish the same results. The filtration rate increases linearly with the addition of diatomaceous earth, because this filter aid exerts merely a physical effect. However, the effectiveness of lime reached a maximum coagulating effect at a dose of 2100 ppm and this did not increase appreciably with higher dosage. Use of lime is recommended when the filter cakes are to be disposed of. However, For reuse of fibre, Diatomite filter aids are more appropriate.

It was necessary in the case of paperboard sludges that the sludge slurry be of 2% or higher concentration to obtain a cake about ⅛ inch or more in thick. This concentration could not be attained by settling, but was attained by flotation. Alum seems to be more effective than lime in preconditioning paperboard sludges for filtration. Filter aids (diatomaceous) were not effective. In the case of sludge with 3% solids, a 150 ppm dose of alum resulted in a computed solids removal of 5.5 lbs./sq.ft./hr. The pH of the effluent was 7.7 and only little changed from that of the original sludge. A 5000 ppm lime dose necessary to produce a ⅛ inch thick cake resulted in solids removal of 3.3 lbs./sq.ft./hr. However, the pH of the exuent is about 11.

Summary

Studies were made on the effect of flotation induced by high speed mixing and chemical treatment, and the effect of coagulants on dewatering of concentrated sludges. Two types of white water sludges were used, namely, tissue paper and paper board sludges. In general, settling or flotation and vacuum filtration applied successively could decrease the moisture content of the sludge from 99-99.5 to about 70%, thus decreasing the water to solids ratio from 99 to 1 to 2.3 to 1.

The buoyant effect of gases coming out of solution can be greatly increased by supersaturation, artificially induced, causing sludge concentration by flotation rather than by settling.

Flotation is more effective than gravity settling in the dewatering of white water sludge.

Lime was found to be a better filter aid than diatomaceous earth in the vacuum filtration of paper tissue sludge. However, the latter is applicable in cases where reuse of fibre is desired.

Alum is more effective than lime in vacuum filtration of paperboard sludges.

It is necessary to have a slurry of at least 1.5-2.0% solids by virtue of the sludge solids concentration per se or by virtue of filter aid addition in order to obtain a filter cake of sufficient thickness to make vacuum filtration feasible.

Acknowledgment

The work reported was sponsored by the National Council for Stream Improvement of the Paper, Pulp and Paperboard Industries.

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3. Eldridge, E. F., A Study of Paper Mill Waste Disposal at Kalamazoo Valley Paper Mills, Mich. Eng. Expt. Sta., Bull. No. 99 (1944).
4. Technical Bulletin No. 5, Nat. Council for Stream Improvement (August, 1946).

NEW LITERATURE

Catalog of Cambridge Wire Provides Belt Reference Data

Development of the Cambridge woven wire belt for use in modern industry, the special features of its construction and story of its successful applications, together with full reference data on conveyor design, conversions, weights and gauges is provided in this complete handbook of the Cambridge Wire Cloth Company, Cambridge, Md.

How the spiral wire belt performs as an effective and economical conveyor belt to carry products from one point to another or from one process to another, and its particular adaptation in permitting treatment of the materials simultaneous with their movement while on the belt is described and illustrated in one section. Selection of the proper metal or alloy to control elements of corrosion, oxidation and abrasion is the subject of another section. High temperature belts, installation and operation also are discussed in detail.

Related to this hanbook is the catalog on Cambridge Wire Cloth and Metallic Screen which presents in concise form some of the fundamental information concerning the alloys and products of the company.

Both catalogs are available from manufacturer.

Spiral Conveyor Catalog Issued By Jeffrey

The latest and most complete catalog of Jeffrey Spiral Conveyors and Fittings supersedes all data and lists given in previous Jeffrey catalogs.

Six principal types of spiral conveyors are listed: sectional flight, helicoid, mixer, cut flight, ribbon and cast iron. Selection tables list the various classes of material which can be handled effectively by the spiral conveyor and indicate the proper type to use. Capacity tables show the proper size of conveyor to use to obtain the capacity desired, and the Horsepower Formula will assist in calculating the power required. All equipment listed is said to conform to new Industrial Standard dimensions.

Copies of this catalog, No. 803, are available from Jeffrey Manufacturing Company, Columbus 16, Ohio.

Paper Mill Cleaning Presented By Magnus

The Magnus Chemical Company, Inc., manufacturers of industrial cleaning materials, announce the issuance of the new Paper Mill Cleaning Handbook.

Written by R. W. Mitchell, Ph.D., one of this country's leading authorities on industrial cleaning, the handbook presents in easy-to-read style the cleaning and related operations encountered in every phase of paper manufacture. The method of presenting the data in the handbook is to discuss the nature of the cleaning problem involved and the kind of cleaning method and cleaner called for. This is followed by a description of the Magnus materials and methods recommended and

full directions for their use. The handbook is indexed to permit easy finding of any subject and illustrated with clear *on the spot* photographs.

For copy write to the Magnus Chemical Co., Inc., Department *PT*, Garwood, New Jersey.

Reinhold-Gould Releases Two New Price Lists

Striking a high note in price-list design and utility, two new reference books were this week issued by Reinhold-Gould, Inc., New York fine paper distributor.

Both books and a third soon to be published spotlight "easy - on - the - eye typography" and "complete reference material." C. V. Morris, vice-president, was credited with creation of the lists.

One of the already published works, devoted to Linweave Quality Papers and Announcements, carries full information about the latest additions to the post-war Linweave line.

The second book to reach paper buyers this month introduces Gould papers for the stationer. It is described in a foreword as "The Key to Modern Paper-buying" in the retail stationery trade. Representing a new phase of expanded paper marketing, this 54-page catalog features Keebord, Hammermill and Ecusta typewriter papers, kindred office papers, manifold, mimeograph, duplicator, copy paper, blotting, 33 varieties of envelopes, stationery cabinets, filing supplies, pads, stenographers' note books, adding machine rolls and gummed tape.

Copies may be obtained by writing to Harry E. Gould, president, Reinhold-Gould, Inc., 535 Fifth Avenue, New York 17.

Ion Exchangers Bulletined By Liquon

Engineers and operators of plants using or considering the installation of new ion exchange equipment or the replacement of the exchanger material in existing plants will be interested in a new bulletin on ion exchangers (zeolites) just published by Liquid Conditioning Corporation.

This concern manufactures equipment and materials for all water treating and liquid conditioning processes, and the bulletin describes its Liquonex cation zeolites and anion exchangers. The bulletin includes explanations of the correct applications, advantages and characteristics of many types of resin, greensand and synthetic gel zeolites to assist in assuring correct selection for specific water conditions and plant requirements.

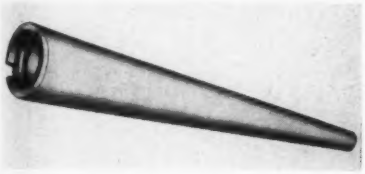
Copies of this informative bulletin (No. 13) can be obtained by writing to Liquid Conditioning Corporation, Dept. PT, 114 East Price St., Linden, N. J.

EQUIPMENT AND SUPPLIES

Aluminum Paper Cores Cut Shipping Costs

Aluminum is finding a new and economical application in the paper industry in the form of paper stock cores, according to an announcement made recently by the Hubbard Spool Company, 1620 Carroll Avenue, Chicago 12.

These cores are made of Reynolds heat-treated aluminum alloy tubing reinforced at the ends with special steel inserts. In one standard size the tube weighs only 35 pounds, as compared to an 85 pound cast iron core formerly used for the same size paper roll. Inasmuch as paper manufacturers in many cases pay the return freight on shipping cores returned to them by their customers, it can easily be seen that the appreciable weight differential on aluminum tubing adds up to a considerable saving.



Further advantages claimed for the aluminum tubing are its imperviousness to rust or other corrosion and to its high strength. It will withstand the rough treatment that cores are frequently subjected to in transit.

Inasmuch as the aluminum tubing cores are precision extruded, they are proof against warping, consequently remain true and feed paper from the roll evenly clear down to the core.

The Hubbard Spool Company is currently manufacturing these cores in the standard 4 inch, 5 inch and 6⅜ inch outside diameter sizes, but is prepared to quote on other diameters. Full information can be obtained from the manufacturer.

Spencer Kellogg Develops Industrial Soybean Protein

Development of a new refined soybean protein for industrial use to be trade named *Kelkote* is made known by Spencer Kellogg and Sons, Inc. The new product is already in use in the preparation of wallpaper coatings, and further research is expected to develop many additional applications.

The manufacturer states that in form *Kelkote* is a fine powder light cream in color which in refinement closely approaches the isolated proteins. It is reputed to have high adhesive strength and to be compatible with isolated proteins, casein, latex and various pigments.

Among the probable important uses are the paper and paper converting industries, protective coatings, glues and plastics. A bulletin giving the chemical analysis, physical data, and other technical information is available on request from Spencer Kellogg and Sons, Inc., Decatur 80, Ill., where *Kelkote* research and production are centered.

Rosmait Patents Flow Mixer

APPLETON, Wis.—An original design for a flow mixer to be used with papermaking machines has been patented by John A. Rosmait of this city. It features a number of twisted, perforated vanes enclosed in a cylinder. They are in two sets, each attached to a shaft which rotates in a direction opposite of the other. Pulp ingredients become thoroughly mixed in the process. There are eight claims of originality. The rights have been assigned to the D. J. Murray Manufacturing Company of Wausau, Wis.

Foxboro Instruments Measure Roll Surface Temperatures

FOXBORO, Mass.—Instruments for the accurate measurement and control of roll surface temperatures of calenders, dryers, and similar roll-type machines, have been announced by The Foxboro Company, well known industrial instrument manufacturer. Bulletin 405, which will be sent on request, describes and illustrates recorders and controllers, typical installations, and the new-type measuring head which gives the Foxboro equipment its high sensitivity. In operating between —40°F. and +350°F., and at all ordinary operating speeds, continuous temperature measurement is assured within 2 degrees, and even higher accuracy is possible in individual installations, depending upon conditions.

The measuring head is a small box-like unit, faced with low-friction material and containing a tiny but durable resistance element contacting a T-shaped spring of thin stainless steel, chromium plated. Pressure against the machine roll is constant and sure, but so light that no marking of the equipment or goods is incurred. The measuring head is connected by 3-wire cable of any length with a standard Foxboro Dynalog Temperature Recorder, with which a Model 40 Controller, of any control-action type desired, may be combined.

Numerous important advantages are claimed for the Foxboro equipment over previous methods of roll surface temperature measurement.

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PACKAGING SYSTEMS—Bags and Bag Filling Machines

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1948		Corresponding Weeks—1947	
April 3	100.0	April 5	106.1
April 10	102.4	April 12	100.7
April 17	100.4	April 19	105.9
April 24	102.5	April 26	105.3
May 1	103.5	May 3	107.5
May 8	*103.3*	May 10	107.9

COMPARATIVE MONTHLY SUMMARIES

1947						1948	
Jan.	102.1	May	106.2	Oct.	109.5		
Feb.	105.9	June	106.0	Nov.	109.3	Jan.	100.9
Mar.	106.1	July	93.5	Dec.	101.5	Feb.	100.3
Apr.	105.1	Aug.	104.2			Mar.	100.6
		Sept.	102.0	Year Avg.	104.3	Apr.	*102.5*

COMPARATIVE YEARLY SUMMARIES

	1941	1942	1943	1944	1945	1946	1947	1948
Year to Date	91.7	102.5	88.9	88.2	88.3	100.2	105.3	*100.9*
Year Average	97.4	90.4	87.8	88.1	89.4	101.1	104.3	

NOTE: *As of January 10 capacity base increased by 13.3%.*

PAPERBOARD OPERATING RATIOS†

Current Weeks—1948		Corresponding Weeks—1947	
April 3	98	April 5	102
April 10	103	April 12	96
April 17	100	April 19	102
April 24	102	April 26	100
May 1	102	May 3	102
May 8	*101*	May 10	101

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1947	99	103	101	100	101	101	90	99	96	101	99	89	98
1948	99	100	102	*102*									

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association

Paper Products Under Export Licenses

Compiled by American Paper and Pulp Association

Require Individual Validated License

Commodity	*Export Schedule B No.*
Newsprint	4712.00
Cypher paper, for military code books; field book paper	4714.00
Waxed paper, microcrystalline, ammunition paper, cartridge paper, shell and shell packing paper, blasting paper and dynamite paper	4721.00
Tin foil	4725.00
Cable electrical filling paper; capacitor tissue paper, Kraft; condenser tissue, electrical conduit twine; Kraft condenser tissue, tissue not indexed under a specific name	4726.98
Toilet paper	4728.00
Other container board (other than Kraft) and boxboards, folding and set-up	4731.00
Bristols and bristol board	4732.00
Gun wadding and munition board	4733.00
Sheathing and building paper	4735.00
Filter paper	4741.00
Heavy fiber shipping containers of corrugated or solid container board	4781.00
Envelopes	4793.00

Under General License (GRO)

Commodity	*Export Schedule B No.*
Book paper, uncoated	4714.00
Cover paper	4720.00
Greaseproof and waterproof paper	4721.00
Wrapping paper, except Kraft	4723.00
Kraft wrapping paper	4724.00
Surface coated paper	4725.00
Cigarette paper	4726.05
Other tissue and crepe paper	4726.98
Paper towels and napkins	4729.00
Kraft container board	4730.00
Other paperboard (except container and boxboard)	4733.00
Fiber insulation board	4736.00
Wallboard	4738.00
Blotting paper	4741.00
Filing folders, index cards and other office forms	4750.00
Papeteries	4760.00
Writing paper	4761.00
Paper hangings or wallpaper	4775.00
Heavy shipping sacks	4777.00
Other paper bags	4778.00
Other boxes and cartons (other than heavy fiber shipping containers of corrugated or solid container board)	4782.00
Vulcanized fiber sheets, strips, rods and tubes	4795.00
Cash register and adding machine paper	4797.00
Paper, related products, and manufactures not elsewhere shown	4799.00

Marcalus Modernization Boosting Production

BOSTON, Mass.—Plans are under way for improvements in the pulp plant of the Marcalus Mfg. Co., at Lincoln, N. H., costing from $300,000 to $400,000. The rebuilt No. 1 machine has resumed production and is expected shortly to reach its maximum speed of 750 feet a minute, as compared with the original speed of 400 feet a minute. The new hydro-pulper of Marcalus is now in operation also, with a new slush system which will enable the mill to utilize kraft pulp in combination with sulphite and ground wood pulp.

Kimberly-Clark Holds Sales Meeting

NEENAH, Wis. — Eighteen district and division managers of Kimberly-Clark Corporation's sales division attended a three-day conference here, at the semi-annual sales meeting. Most of the sessions were at the Kimberly-Clark main office, and luncheons were served at the Valley Inn.

A dinner at North Shore Golf Club on Tuesday evening, May 4, included the corporation's executive committee, operating management committee, district representatives and managers and division managers. The group went on a trip to the Niagara, Wis., mill of Kimberly-Clark on Thursday, May 6.

Among the out of town representatives here were Dan Keck, Chicago district manager; H. P. Westler, district representative of San Francisco; F. R. Haggren and G. E. O'Malley, New York; S. E. Fithian and R. G. Piltz, Chicago; G. L. DuBois, Atlanta; J. O. Moen, San Francisco; J. M. Duprier, New York; and E. A. Johnson, Chicago.

Poland's Paper Production

Until the present time it has been almost impossible to learn anything about the fate of the paper factories in the East-German territories taken over by Poland. Recently the Polish news agency *West* announced a few figures. According to these, rehabilitation of the industry is making only slow progress. Of the 154 occupied plants, many of which were heavily damaged, only 44 had started to operate and 36 were in the process of being repaired by the end of 1946. The other 74 plants are apparently too greatly damaged to warrant rebuilding. They are to be taken down and equipment not too damaged will be salvaged for use in the other plants.

The production quotas, in metric tons, for 1947 for the paper, board and pulp industries were: 72,000 tons of paper, 18,500 tons of board and 10,200 tons of pulp (1948 figures are not available).

Planned production for 1949 is: 85,000 tons of paper, 21,500 tons of board and 31,000 tons of pulp.

In 19 vocational schools 3,350 specialists for the paper industry are being trained under the Polish three-year plan. At the present time the plants taken over from Germany employ about 10,000 men of whom 700 are Germans, who also are expected to be replaced by Polish workers in a short time.

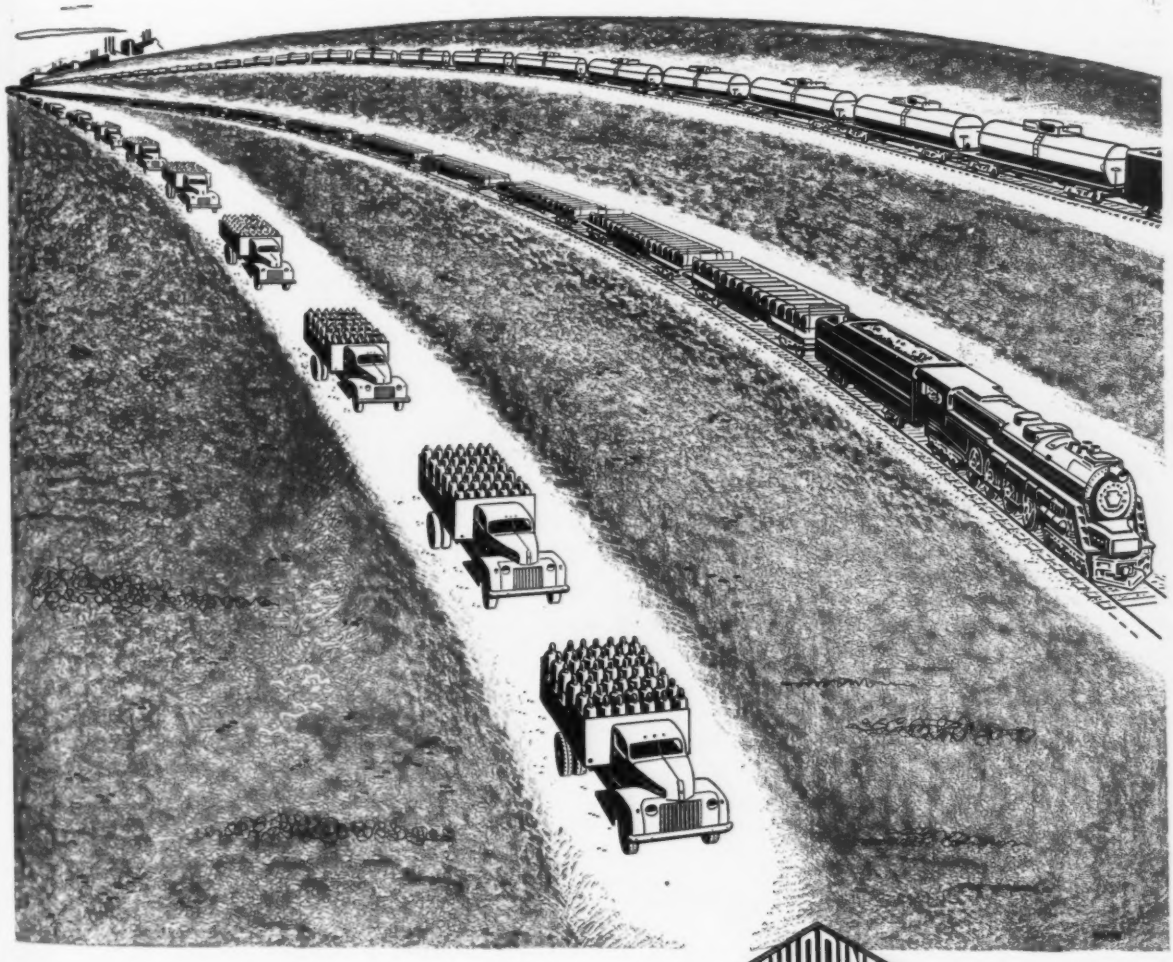
OIT Adopts Quarterly Plan For Soda Export Licenses

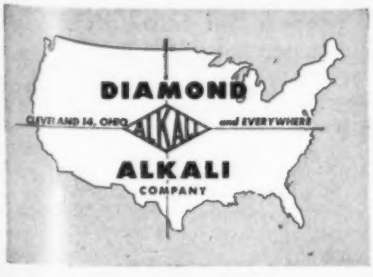
WASHINGTON—Export license applications for caustic soda and soda ash will be acted on only once each quarter by the Office of International Trade, instead of once each month, as formerly, beginning July 1, the agency announced this week.

The change was necessitated by the disproportionate number of applications in relation to the size of export quotas, it was explained. Because of the large number of applications on hand, the agency continued, those for April have been acted upon, but applications received for May and June consideration will be deferred for action in a single licensing operation toward the end of the second quarter.

The OIT also reported it was seeking, through license actions, to prevent export of these commodities being channeled into the hands of a limited number of importers abroad.

DIAMOND *Liquid* CHLORINE





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National Paperboard Ass'n

(Continued from page 7)

that meeting. Adler's report covered subjects considered by the board, including the following:

Additions to the membership (present membership now at an all-time high); finances; Basis of Association Dues; Budget; Issuance of Charts to Members; meeting places, and appointment of a nominating committee to submit nominations for president and vice-president of the Association, to be elected at annual meeting. The Committee consists of: Sidney Frohman (chairman), Henry D. Schmidt; Charles E. Nelson, and W. Irving Osborne, Jr.

A report entitled "The Outlook for the American Economy and for the Paperboard Industry in the Last Three Quarters of 1948," was submitted by Dr. Charles F. Roos, president of the Econometric Institute, Inc.; Malcolm K. Whyte, counsel reported on "Developments Under the Taft-Hartley Law," and W. G. Latham of the Ft. Orange Paper Co., covered "the Waste Paper Situation" and the "Save-Waste Paper" Program in the East:

In connection with the Save-Waste Paper Program in the Middle West, W. H. Beckwith, of Morris Paper Mills, Morris, Ill., stated that the public relations program of the Midwest Consumers of Waste Paper is now well into its third year of operation. The program, he stated, is administered by a five-man committee made up of Paul Schilling, Karl Schneider, Irving Osborne, Jr., Marvin Swain and himself.

He explained that the purpose is to assist both dealers and mills in better methods of handling, sorting and delivering waste paper and he emphasized that the program devises ways and means for dealers to standardize bales, improve plant facilities, increase tonnages, and properly clean, sort and load their waste paper. Labeling of bales, he stated, is constantly being urged by the Committee and well over one-third of the dealers reached by the program are now labeling their paper.

In summing up, he expressed the view that considerable improvement in cleanliness and quality have been noted by the mills which is traceable to the program.

H. M. Kieckhefer, of Kieckhefer Container Co., Camden, N. J., reported on "Present Supply and Outlook for Pulpwood in the South." This report referred to the bad weather which prevailed during the latter half of 1947 and continued through February of this year. He stated that clearing skies in March reflected a pick-up in wood production and that presently the mills are receiving more wood than is being consumed. He expressed the view that with continued good weather, production this summer will be sufficient to supply consumption and permit the building of reasonable inventories by fall. He also stated that labor in the woods is more plentiful this year than at any time since the beginning of the war, and that equipment problems have eased somewhat, but that railroad cars for pulpwood loadings are still in short supply.

Alan G. Goldsmith, of The Mead Corp., Dayton, Ohio, submitted an interesting report on Woodpulp. This report included data on the production of pulp in 1947, and also on imports and inventories.

Commenting upon the outlook for pulp supplies in the future, Goldsmith emphasized that the big question mark is ERP, and our present rearmament program. In concluding the report, he pointed out that there has been an easing in the pulp situation and that the previous acute shortage is over, at least for the time being.

Mead Again Heads Improvement Group

WAUSAU, Wis.—George W. Mead, Wisconsin Rapids, president of the Consolidated Water Power and Paper Company, was reelected president of the Wisconsin Valley Improvement Company at the annual meeting May 12 in the company's offices in the Wisconsin Valley Trust Company building.

Other officers were also retained: D. C. Everest, president and general manager of Marathon Corporation, vice president; M. W. Kyler, vice president and general manager; L. W. Hackbart, secretary-treasurer; Miss Emma M. Koehler, assistant secretary; L. L. Sheerar, assistant treasurer, and R. E. Puchner, counsel.

The company maintains a chain of reservoirs on the Wisconsin river to provide power for paper mills and public utilities. Its directors are officers of these concerns. Elected to the board were: Mr. Mead; R. G. Walter, Madison; Neal Nash, Port Edwards; Norman S. Stone, Mosinee; Grover Keeth, Wausau; C. E. Kohlhepp, Milwaukee; Folke Becker, Rhinelander, and C. C. McLaren, Tomahawk.

The directors did not consider the situation very favorable for normal power generation, largely because snowfall during the winter was less than normal. However, heavy rainfall thus far this month has brightened the outlook considerably. On Sunday, May 9, the reservoir system reported a gain of 283,000,000 cubic feet during the previous week. But the reservoirs were filled only to 67.63 percent of capacity. Total storage was 11,509,000,000 cubic feet as compared to 14,400,000,000 cubic feet on the same date last year, and 10,603,000,000 on the corresponding date in 1946. Average precipitation thus far this year totaled 5.37 inches, or 1.83 inches below the 59-year average for the period.

The company is cooperating with the Wisconsin Power and Light Company, Madison, in the creation of an illuminated and animated reproduction of the Wisconsin river at the Wisconsin Centennial at West Allis August 7 to 29, based on the theme, "The Hardest Working River of the Nation." The display, being designed by the American Display Studios of Chicago, will be on an illuminated mahogany table, 6 by 20 feet.

Celanese Subsidiary Wins Forest License

VANCOUVER, B.C.—Plans of Celanese Corporation of America for the construction of a cellulose plant in Canada were advanced early this month when Columbia Cellulose Company, Ltd., a subsidiary, received from the government of British Columbia, a forest management license for extensive tracts of forest land in the province. This is the first license to be issued under the amendment to the Forest Act, authorized at the 1947 session of the British Columbia Legislative Assembly.

The land covered by the management license is in the Prince Rupert forest district and includes parts of the watershed areas of the Skeena and Nass Rivers.

The forest reserve allotted will provide a sustained wood supply for the cellulose plant on Watson Island, near Prince Rupert, which possesses excellent deep water wharfage and transcontinental rail and highway facilities.

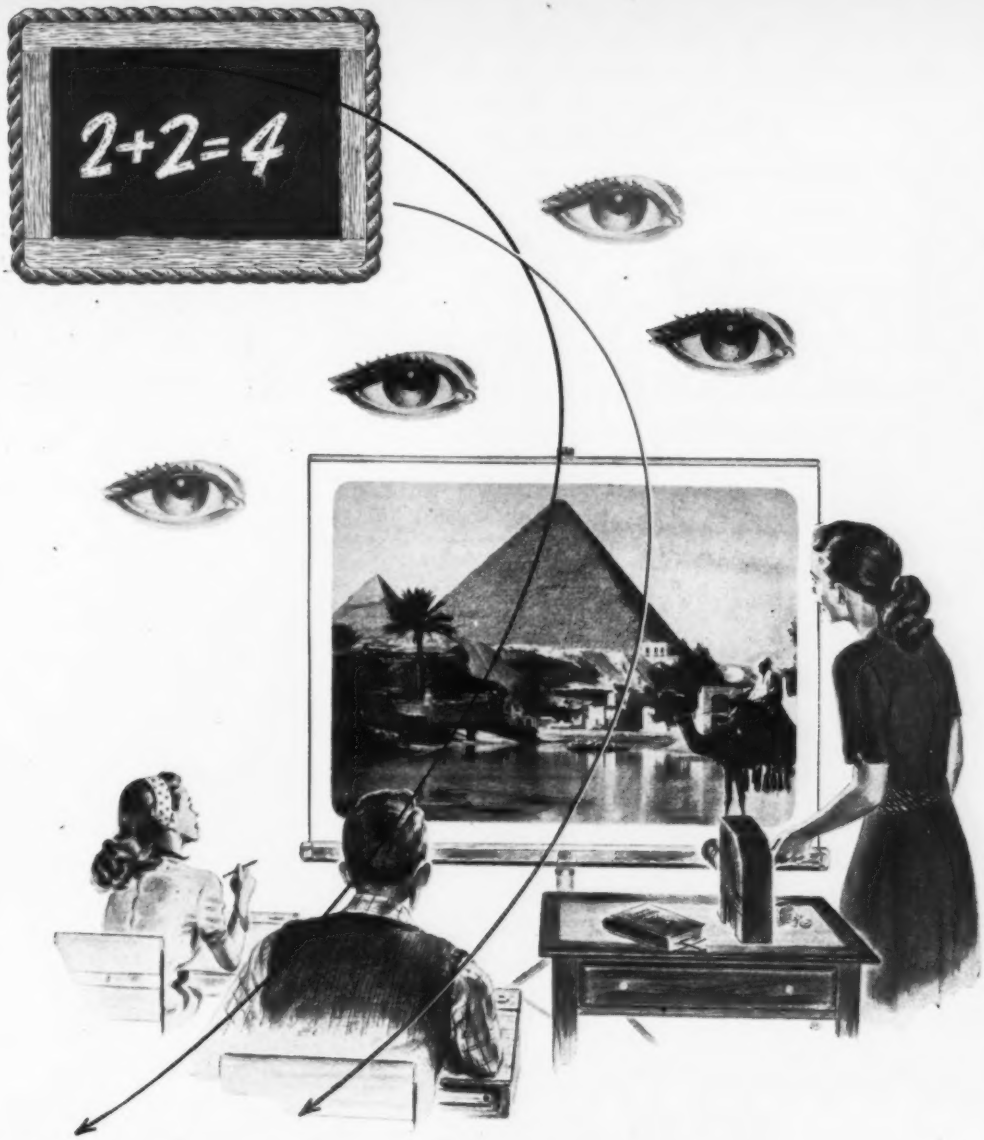
Preparation of the site of the cellulose plant is nearing completion and construction is scheduled to begin shortly. It is estimated that approximately two years will be required to complete the project. Present plans call for a production capacity of 200 tons daily of highly purified cellulose.

Drs. D. F. Othmer and R. S. Aries On European Trip

BROOKLYN, N. Y.—Robert S. Aries and Donald F. Othmer of the Polytechnic Institute of Brooklyn, will depart on May 29, on an extended European tour. They are delegates to the centenary celebrations of the French Engineering Society in Paris and will also visit for American interests, plants in Switzerland, Spain, Western Germany and Sweden. Dr. Aries will address the respective societies of the chemical industry in Paris and Bruxelles, while Dr. Othmer will deliver a series of lectures in several Swiss universities.

Leeds & Northrup Vets, Wunsch and Roth, Retire

PHILADELPHIA, Pa.—Felix Wunsch, electrical engineer, and Paul V. Roth, shop engineer of the Leeds & Northrup Co., manufacturer of electrical measuring instruments, automatic controls and heat treating furnaces, have retired from active service. Wunsch was with the firm for 43 years; Roth for nearly 46.



feature attraction—today's lesson

Education is more stimulating and effective today because pioneer educators have continually introduced new methods and techniques of instruction . . . such as the dramatic use of motion pictures in visualization. In other fields, also, the cumulative effects of continuous pioneering are increasingly evident. Typical is the field of electro-chemical production, in which pioneer research and development work by Niagara has resulted in improved product quality and processing efficiency in scores of industries that use these chemicals. Today, Niagara is "An Essential Part of America's Great Chemical Enterprise."

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IMPORTS

NEWSPRINT

H. G. Craig Co., Kermic, Donnacona, 360 rolls.
News Syndicate Co., Ethel Tombs, Donnacona, 302 rolls.
N. Y. Journal American, Markland, Liverpool, N. S., 1140 rolls.
N. Y. Herald Tribune, Markland, Liverpool, N. S., 1764 rolls.
N. Y. World Telegram, Markland, Liverpool, N. S., 715 rolls.
Brooklyn Eagle, Markland, Liverpool, N. S., 848 rolls.
Herald Statesman, Inc., Markland, Liverpool, N. S., 43 rolls.
Richmond Newspapers, Inc. (Richmond, Va.), Markland, Liverpool, N. S., 1785 rolls.
Price & Pierce, Markland, Liverpool, N. S., 202 rolls.
R. A. Olsen, Donpaco, Donnacona, 383 rolls.
R. A. Olsen, Newscarrier, Donnacona, 391 rolls.

WALLPAPER

Hudson Shipping Co., Matelot Beaune, Havre, 58 pkgs.
All Transport, Inc., Oregon, Havre, 7 cs.
R. F. Downing & Co., Inc., American Shipper, Havre, 39 cs.

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NEW YORK IMPORTS

WEEK ENDING MAY 15, 1948
SUMMARY

Newsprint	7933 rolls
Wallpaper	58 pkgs., 46 cs.
Paperhangings	19 cs.
Filter Paper	20 cs.
Printing Paper	1 cs.
Wrapping Paper	265 rolls
Photo Paper	87 cs.
Drawing Paper	1 cs.
Sensitized Paper	15 cs.
Miscellaneous Paper	5 cs.

PAPERHANGINGS

W. H. S. Lloyd & Co., American Flyer, London, 19 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., American Flyer, London, 20 cs.

PRINTING PAPER

Lafayette Co., American Flyer, London, 1 cs.

WRAPPING PAPER

E. De Vries Co., Executor, Trieste, 265 rolls.

PHOTO PAPER

Lep Transport, Inc., American Flyer, London, 87 cs. (base).

DRAWING PAPER

N. Nydegger, Noordam, Rotterdam, 1 cs.

SENSITIZED PAPER

Huiskamp & Sanders, Noordam, Rotterdam, 15 cs.

MISCELLANEOUS PAPER

W. J. Byrnes, Queen Elizabeth, Southampton, 1 cs.
Globe Shipping Co., Oregon, Havre, 1 cs.
Coty, Inc., American Flyer, Havre, 1 cs.
S. H. Pomerance, American Flyer, London, 2 cs.

RAGS, BAGGINGS, ETC.

New England Waste Co., Herdis, Buenos Aires, 87 bls. cotton waste.
J. P. Fleisig Co., Goya, Havre, 172 bls. rags.
Cowa Co., Hunter Victory, Cabedello, 280 bls. cotton waste.
W. Steck & Co., Exminster, Alexandria, 74 bls. scrap bagging, 72 bls. heavy jute bagging, 56 bls. old light hessian bagging.
E. J. Keller Co., Inc., Exminster, Alexandria, 48 bls. old burlap bagging.
(———), Mount Rogers, Bombay, 200 bls. old jute rags.
H. Adlerstein, Mount Rogers, Genoa, 217 bls. jute rags.
H. Adlerstein, Mount Davis, Genoa, 122 bls. jute rags.
(———), Mount Davis, Leghorn, 99 bls. cotton rags.
Loumar Textile By-Products, Inc., Pierre Victory, Antwerp, 73 bls. old waste bagging.
Continental Bank Trust Co., Exhibitor, Cochin, 100 bls. old jute rags.
A. De Vries Trading Corp., Coral Sea, Antwerp, 70 bls. old bagging.
J. P. Fleisig Co., Executor, Leghorn, 108 bls. dark cotton rags.
(———), Executor, Venice, 146 bls. waste bagging, 248 bls. rags.
Continental Bank Trust Co., Executor, Venice, 283 bls. waste bagging, 83 bls. rags.
(———), Executor, Messina, 103 bls. paperstock.
J. Eisenberg & Son, Agwiking, Havana, 60 bls. rags.
E. J. Keller Co., Inc., Exton, Bombay, 50 bls. old jute rags.

OLD ROPE

(———), Combe Hill, Calcutta, 65 bls. old hemp rope cuttings.
(———), Exton, Calcutta, 60 bls. old hemp rope cuttings.

CASEIN

Casein Co. of America, Div. of The Borden Co., Herdis, Buenos Aires, 1000 bags (ground lactic).

GLUESTOCK

John Gorvers, Santa Monica, Barranquilla, 390 pkgs.

WOODPULP

Price & Pierce, Ltd., Markland, Liverpool, N. S., 2055 bls. sulphite pulp.

BOSTON IMPORTS

WEEK ENDING MAY 15, 1948

Brown Bros. Harriman & Co., Coer d'Alene Victory, Genoa, 71 coils, 72 bls. old rope.

PHILADELPHIA IMPORTS

WEEK ENDING MAY 15, 1948

A. L. Feuerman, Executor, Venice, 237 bls. rags.

NORFOLK IMPORTS

WEEK ENDING MAY 15, 1948

J. P. Fleisig Co., Pierre Victory, Antwerp, 111 bls. rags.

Plunkett Sets Retirement

NEW YORK CITY—Ambrose T. Plunkett, vice-president and director of the Taggart Corp. and the St. Regis Paper Sales Corp., Watertown, will retire from company service on July 1 after having been associated with those firms for 33 years.

Plunkett, his wife and their daughter, Miss Catherine C. Plunkett, are now at St. Lawrence Park in the Alexandria Bay section of the Thousand Islands, where they plan to spend the summer.

The American Pulp and Paper Mill Superintendents Association, Inc.

28th Annual Convention
Roosevelt Hotel
New Orleans, La.
May 19-21, 1948

Association Office
220 East 42nd Street
New York 17, N. Y.

Valley Chemists Visit Dalton Pioneer Mill

DALTON, Mass. — A meeting of the Connecticut Valley section of the American Chemical Society was held here May 8. Dr. Robert Martin of the chemical department, plastics division, of General Electric Company, was in charge of the meeting.

An inspection trip through the Pioneer Mill and Paper Museum was arranged by Dr. Francis L. Simons of the technical staff of Crane & Company.

In the afternoon, at the Community House, Dr. Simons presented a paper to the section on the subject, "Anti-Counterfeit Papers in Theory and Practice." Dr. Simons said that American technical literature contains few authoritative articles on counterfeiting and forgery, and the means of preventing such frauds. He discussed the fundamentals of counterfeiting, the problems of the forger, and the risks he must be prepared to take. Typical methods of preventing frauds will be discussed. Dr. Simons is of the opinion that a better popular understanding of forgery and counterfeiting would help prevent the losses caused by them.

Following the meeting in the Community House, there was a dinner at the Irving House, with 75 attending.

Dr. Simons has had many years of experience in the paper field. He received a Ph.D. in chemistry from Yale in 1923, and taught at Brown University for a few years after that. He spent some years in general consulting work, and was later technical director and plant superintendent for the largest manufacturer of bank checks in the United States.

Will Close Carton Plant

VICTORY MILLS, N. Y.—The United Board & Carton Corp. is closing its plant here. The plant employed more than 300 when operating at capacity. The company will continue to run its plant at Thomson, in near-by Washington County.

Mexican Kraft Mill Names Wise U. S. Sales Agent

NEW YORK — Upon his return from Mexico this week, George S. Wise, president of the Wise Pulp & Paper Corp., reported that as of May 1 his firm was named exclusive sales agent in the U.S.A. for the Compania Industrial de Atenquique, S.A., manufacturer of kraft pulp and paper in the state of Jalisco, Mexico.

The Compania Industrial de Atenquique, S.A., kraft mill has new and modern facilities for production of unbleached kraft pulp, boards, and paper. Recent changes and additions have further increased production and improved the quality of the pulp and paper manufactured, Wise states.

Wise has been associated with development of the paper industry in Mexico for many years. In recognition of his services to that country, the Mexican Government has awarded him the Order of the Aztec Eagle, highest decoration it can bestow on a foreigner.

George W. Shine Joins NPTA Executive Staff

NEW YORK — The National Paper Trade Association has added George W. Shine to its staff. His province will include both Fine and Wrapping Paper Division relations and activities. After essential preparatory work to acquire acquaintance with the membership and become familiar with organization activities and operations in both branches of the trade, Mr. Shine will spend much of his time in the field.

Mr. Shine has considerable paper background. For several years before the war he represented Dennison Manufacturing Company in New York City, gaining thorough knowledge of the market for their converted products and a personal acquaintance with the local trade. In 1940 he entered the Army, rising from second lieutenant to lieutenant colonel. He was an operations officer on the special staff of General Bradley in Europe and decorated by both the United States and French Governments for his "responsibility acceptance, tactful judgment, extraordinary discretion and demonstrated executive ability contributing in large measure to the success of the Armed Forces."

He lives in Crestwood, where he has been chairman of the Red Cross Drive and vice-commander of the American Legion, Bronxville Post.

F. S. MacDonald Manages Homad Services, Ltd.

MONTREAL — Frank S. MacDonald has been made vice-president and general manager of Homad Services Ltd., a new organization which has been granted a Dominion charter to serve the pulp and paper and process industries with stock preparation systems, beating apparatus, new improved Claflin refining, stock storage equipment and mixing equipment. Mr. MacDonald was recently associated with Sherbrooke Machineries Ltd. and formerly with J. R. Booth Ltd.

Homad Services Ltd. will be located at 1445 Crescent Street, Montreal, after June 1.

F. J. Hoar of Watertown, N. Y., who is also associated with G. D. Jenssen Company, Inc., of Watertown, is president of the new company.

Southern Board Starting At Port Wentworth, Ga.

PORT WENTWORTH, Ga. — Southern Paper Board Co. was due to start operations at the time this issue of PAPER TRADE JOURNAL went to press.

OBITUARY

Frank P. Wilder

CARTHAGE, N. Y.—Frank P. Wilder, 74, a prominent paper mill executive, of Carthage for more than 35 years, died May 9 in his home in Portland, Ore.

Mr. Wilder assisted in the formation of the Carthage Sulphite Pulp Company in 1898, was elected its secretary and two years later became treasurer. He was also a director in Carthage of the Champion Paper Company, the West End Paper Company, and the Glenfield and Western railroad.

Mr. Wilder left Carthage in January, 1928 to accept a position as sales manager for the H. Waterbury and Son Company of Oriskany with the states of Washington, Oregon and California as his territory.

At the time of his departure for the west coast, Mr. Wilder was secretary-treasurer and general manager of the Diana Paper Company of Harrisville.

After his departure from Carthage Mr. Wilder was a salesman for various types of papermill equipment on the west coast, handling orders for chippers manufactured by the Carthage Machine Company.

Wilfred W. Sunderland

Wilfred W. Sunderland, 75, former president of the Miami Paper Co., and chairman of the board of directors of the Western Tablet and Stationery Co., Dayton, Ohio, at the time of his demise, died in Miami Valley Hospital on May 6. The Miami Paper Co. was merged with the Oxford Paper Co.

Mr. Sunderland was active in the Presbyterian Church and in YMCA work. During 30 years in the latter he served two terms as a member of the board of directors and was vice-chairman of the finance and building committee that constructed the present Dayton YMCA building. He was a member of the Moraine Country Club and a former member of the Dayton Country Club and the Engineers Club.

Surviving Mr. Sunderland are his widow, Anna A.; a son, Francis, and a brother, Herbert.

Edward S. Jenkins

Edward S. Jenkins, 59, president of M. W. Jenkins' Sons, Inc., manufacturer of industrial brushes, died April 30 at his home in Essex Fells, N. J. Mr. Jenkins was a member of the Montclair (N.J.) Rotary Club, Montclair Golf Club, Falmouth (Mass.) Yacht Club, Essex Fells (N.J.) Gun Club, Caldwell (N.J.) Lodge F.&A.M., Montclair Commandry of Knights Templar, and a 32nd Degree Mason.

Surviving Mr. Jenkins are his widow, Louise Collins Jenkins; a son, Richard B.; a brother and four sisters. Richard B. Jenkins succeeds his father as president.

Nekoosa Mill Installs Cottrell Precipitator

PORT EDWARDS, Wis. — A Cottrell electrical precipitator has been installed in the chemical recovery department of the Nekoosa kraft pulp mill of the Nekoosa-Edwards Paper Company. The equipment has been in operation since February 16. Tests conducted by the equipment builders show that slightly over 95 percent of the chemical in the gases leaving the recovery furnace and going to the boiler stack was reclaimed by the precipitator. These tests indicated, and results obtained since the middle of February have shown, that the nuisance due to the discharge of chemical to the atmosphere has been practically eliminated, and chemical purchases to make up for losses in process have been reduced. The white plume characteristic of a kraft recovery stack was noticeably decreased after starting the precipitator.

The over-all height of the precipitator is 55 feet. A tile shell 28 feet long by 21½ feet wide houses the functional part of the equipment. All internal parts are steel. Corrosion is kept at a minimum by keeping the gases above the dew point. This is of utmost importance, also, because of the extremely high voltage up to 70,000 being used. To obtain this high voltage, alternating current at 440 volts is stepped up to the voltage required by means of transformers and is changed to uni-directional current by means of mechanical rectifiers.

The dry type Cottrell precipitator was installed in the Nekoosa mill to remove sodium salts from the gas stream from the Combustion Engineering recovery furnace. The high voltage current employed in the precipitator ionizes the chemicals in the gas and causes them to be deposited on collecting electrodes. The chemical is knocked from the collecting electrodes, by means of automatic air-operated "rappers," into hoppers at the bottom of the precipitator. It is then conveyed through steam jacketed screws to a dissolving tank.

The reclaimed chemical from the dissolver tank below the precipitator is pumped back into the recovery process where it is used to make up the cooking liquor for the digesters. Laboratory tests have shown the reclaimed chemical is 85 percent salt cake or sodium sulphite—the make-up chemical normally purchased to operate the Nekoosa pulp mill.

Styles Presides at Dinner Marking Elish Anniversary

NEW YORK—Stanley O. Styles, New York representative of Martin Cantine Company, acted as toastmaster for the evening at a surprise dinner party Monday night to Dewey Elish, president, by the employes of M. M. Elish & Company, Inc., paper merchants at 29 Beekman Street, in celebration of the 50th anniversary of that firm. The dinner was held in the Green Room of the Hotel Peter Stuyvesant. A beautiful bronze plaque in commemoration of the occasion was presented to Mr. Elish by the employes.

Other guests included Mrs. Helen Elish, Mr. and Mrs. Bertram Daniels, Colonel Charles E. Keegan, New York City Councilman and chairman of the Committee on Finance, his secretary Miss Christine Mirabella, Mr. and Mrs. William Smiddy of Missisquoi Corporation, Mr. and Mrs. Joseph Moses of Falulah Paper Company, Mr. and Mrs. Howard Miller of Howard Paper Mills, Inc., Mr. and Mrs. Louis Gailor of Whiting Plover Paper Company.

Hammermill Expands Its Officer Slate

ERIE, Pa. — Mortimer E. Graham, prominent Erie lawyer and former Erie County district attorney, was elected secretary of the Hammermill Paper Company at the recent board of directors meeting. Bertram E. Claridge, former secretary of the company, was elected vice-president. John H. DeVitt, controller, was elected assistant treasurer. Richard P. Price, vice-president and general superintendent, was appointed to serve on the Hammermill executive committee. Associated with Hammermill since 1926, he has been general superintendent for the past nine years.

Mr. Claridge has been a member of the Hammermill organization since 1924 and for many years directed the company's timber operations in Matane, Canada.

Mr. DeVitt became associated with Hammermill in 1922 and has been company controller since 1944. In addition to his new duties as assistant treasurer, he will continue as controller.

Other officers of the company were reelected to the positions they held prior to this year's annual meeting.

Marathon Starts Building To House Ink Plant

MENASHA, Wis.—Construction of a new, modern building to house ink manufacturing operations has been started by Marathon Corporation, manufacturers of food packages and packaging materials. Completion of the unit, scheduled for fall of 1948, will mark another step in the Marathon expansion and modernization program which provides complete integration and control of every manufacturing operation entering into Marathon's finished products.

The building, located on Milwaukee Street between Fifth and Sixth, will provide 28,000 square feet of floor space in a one story structure, 200 x 140 feet. Built of reinforced concrete, steel, brick and glass, the plant will provide a layout for ink manufacturing, incorporating the most advanced and efficient principles of line production. Complete equipment and facilities for mixing and grinding all types of ink required for the present and future needs of Marathon's printing plants will be installed in the new building. The line of inks manufactured for Marathon and other users includes letter-press inks for carton and wrapper printing, offset, rotogravure and aniline inks.

Gould Mechanizes Its Woods Operations

LYONS FALLS, N. Y. — For the first time in more than 50 years, Moose River is taking its way down to its confluence with Black River without its burden of thousands of spruce logs. The Gould Paper Company has mechanized its woods operations this past winter and now has a two-year supply piled up at the old airport and at the mill and all without benefit of the spring floods of Moose River.

On the loading, unloading, and trucking operations the Gould Paper Company employed around a hundred men this year. These consist of loaders, truck drivers and the mechanics who kept their trucks in operation. They had several tractors and snowplows, twelve or fifteen logloading cranes in use besides the trucks. They also had fifty hook men loading trucks and a crew of twenty-four at the airport unloading trucks with more cranes.

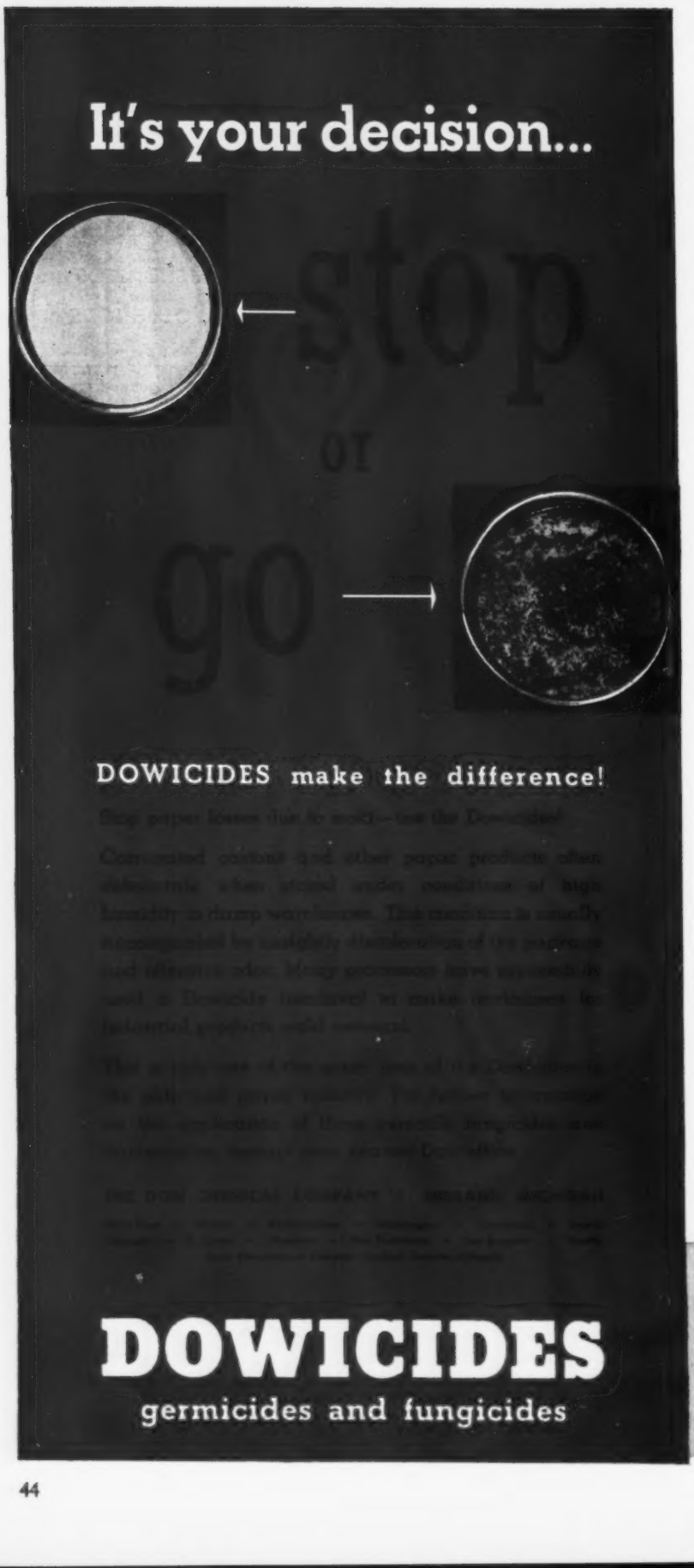
Their own trucks together with hired trucks transported 43,000 cords of wood in 2½ months—and if these trucks were placed end to end they would form a line from Lyons Falls to Utica. They covered 533,000 miles, equal to 22 trips around the world and if the logs were placed end to end, they would extend 1270 miles.

Certain-Teed Re-elects Three Directors

BALTIMORE — A ten-hour annual meeting of the Certain-teed Products Company, Ardmore, Pa., roofing company, returned three members of the board for three years by proxies which represented 1,096,665 of the corporation's 1,620,699 outstanding common shares. The re-elected directors are Henry W. Breyer, Jr., of Philadelphia and Thomas F. Brown and Hamilton Pell of New York.

Col. P. W. Bidwell Leaves Holyoke Machine Co.

HOLYOKE, Mass.—Col. P. W. Bidwell has resigned the presidency of the Holyoke Machine Co. He joined the firm about two years ago as treasurer and general manager and at the last meeting of the directorate was elected president. Before World War II, Bidwell was general manager of B. Perkins & Son of this city.



CHEMICAL COMMENTS

NEW AROMATIC SPECIALTY FOR PERFUMES, SOAP, COSMETICS

C•64 is a new Dow Aromatic Specialty. It possesses richness and warmth, freshness and sparkle—making it adaptable to both modern and oriental type perfumes. Its odor is powerful and spicy, with a slightly minty touch. A highly stable, crystalline material, C•64 blends well with citrus oils and dissolves even in dilute alcohol. It will not discolor milled soap or cosmetic preparations and is therefore a valuable ingredient in the manufacture of those products.

PROPYLENE GLYCOL USED AS SHORTENING EXTENDER

The food industry is making increasing use of low-cost Dow propylene glycol because of its unusual properties as a solvent, humectant, preservative, and wetting agent. Through the wetting action of this highly purified material it has been found possible to extend the effectiveness of shortening in producing baked goods. Propylene Glycol aids in the dispersion of the shortening throughout the batch with a consequent saving of critical shortening not otherwise possible.

AN EFFECTIVE THICKENER FOR IMPROVED DYE PRINTING

Methocel, Dow cellulose derivative, has demonstrated unusual possibilities as a dispersing, thickening, and binding agent. One of its important applications is in textile printing. As a thickener for fast color salts and diazotized bases for printing on naphthol prepared grounds, it yields prints of exceptional brightness, smoothness, and sharpness of mark with greater penetration and efficiency of dyestuff. Methocel can be used in dyes either for machine or screen printing.

Additional information about any of these products is available on request.

DOW
CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

SECTION OF THE

TECHNICAL ASSOCIATION
OF THE PULP AND PAPER INDUSTRY

122 E. 42nd ST., NEW YORK 17, N. Y. *Edited By* R. G. MACDONALD, Secretary

The Mechanism of Water Resistance*

By W. S. Wilson[1]

Abstract

Water penetration tests and equilibrium water and kerosene pickups are plotted for various degrees of engine sizing. From these data, it is concluded that the exterior of pulp fibers can be made practically completely hydrophobic. Bound air, held to these surfaces, then blocks off the capillaries between the fibers so that water can pass into the sheet only through the fibers. The water penetration end point is so sensitive that it sometimes occurs hours before the interior of the fibers are softened enough to reduce the tensile strength of the paper to a negligible quantity.

Data on the time to break strips immersed under constant load, show that: amounts of size indicated to be absurdly excessive by the water penetration test are really very useful, and that aluminum ion concentration and Mersize, both of which have little effect on the water penetration test, are extremely important in decreasing the rate at which tensile strength deteriorates on immersion.

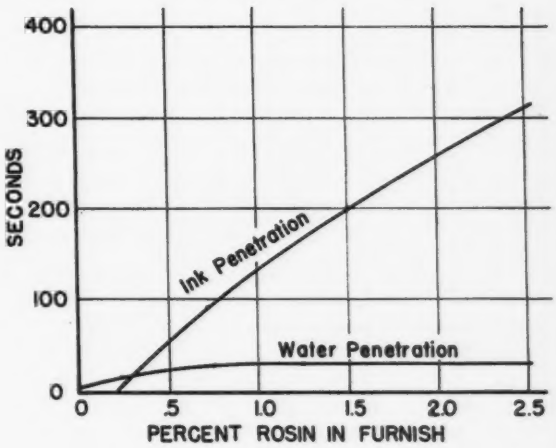


FIG. 1

Figure 1 shows the water and ink penetration on a series of sheets containing increasing amounts of rosin. In a previous paper (*Technical Association Papers* 29: 236 (1946) the author explained the mechanism causing the large time differentials between the two tests and expressed curiosity as to why the water penetration test arrived at an insurmountable optimum at such a very low rosin furnish. This paper presents what he considers a logical explanation of this low dosage impassible barrier.

Suppose a sheet of paper contained two kinds of holes. One type of hole is very large and it is known how to plug them to any desired degree by means of engine sizing. The other type of hole is very small and there is no known method of plugging them. On an unsized sheet, the water would rush into the big holes and the sheet would fill up instantly. As the degree of sizing is increased, eventually the big holes would be completely plugged but, by hypothesis, the small holes are unplugable and no amount of engine sizing can increase the penetration time beyond that required for the small holes to fill the sheet. In other words, two kinds of holes, one plugable, the other unplugable could explain the water penetration type of curve.

There really are two kinds of holes in a sheet of paper; first the capillaries between the fibers and second the capillaries inside the fibers. It will be shown that theoretically, it is highly probable that the exterior surfaces of pulp fibers can be made so hydrophobic that water cannot penetrate the capillaries between the fibers. It is well known that the capillaries inside the fibers are very hydrophylic and it will be shown that theoretically, it is very unlikely that engine sizing can change the sitaution.*

Finally, experimental evidence will be introduced to show that engine sizing can make the exterior fiber surfaces so hydrophobic that no water can get in between the fibers and that ordinary engine sizing has very little effect on the amount of water entering the fibers themselves or the rate at which it goes in.

Water Penetration

The data are plotted against rosin furnished to the beater, not against rosin retained in the sheet. As a result the sizing plasteau really begins at a somewhat lower amount of rosin in the sheet, than the data indicate. Figure 2 shows two curves of water penetration against per cent rosin. Once curve is for retained rosin and the other for rosin furnished to the beater. The differences are small at low rosin dosages but large at high rosin dosages. These differencs should be taken into account when examining succeeding curves.

Because blanks are large and weighings small, the actual determination of small amounts of retained rosin involves a large number of check runs. Except in special circumstances, the expense is not justified. As rosin

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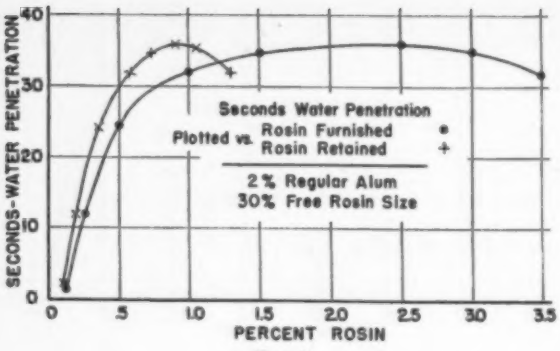

FIG. 2

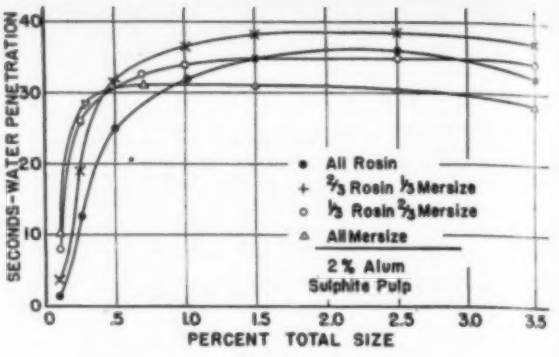

FIG. 3

is retained according to definite adsorption isotherms recirculation of white water can never result in a constant or static equilibrium throughout the making of any series of sheets. That is, the amount of rosin in the white water, or the driving force, is continually increasing and therefore, the amount retained is also continually increasing. A one pass system on a Noble and Wood machine gives a definite and reproducible equilibrium even if the equilibrium in question is somewhat different from mill practice. Believing a real equilibrium, somewhat removed from practice to be preferable to no equilibrium at all, white water is not recirculated and results are plotted against size furnished to the beater.

Figure 3 is a series of water penetrations on 2.5 gram hand sheets. Each curve represents a constant ratio of Mersize to rosin from zero to 3.5% total size. Many such curves have been made on different pulps and all have several characteristics in common. First: all the water resistance obtainable is had with comparatively small dosages of size. Second: increasing alum is about as useless as increasing the amount of size. Third: the line representing ⅓ Mersize generally turns in the highest water resistance and the all Mersize line the fastest initial rise at low size dozages and the lowest final test at high size dosages. The differences shown are typical but so small that they would probably be charged up to experimental error in mill practice.

From these curves, the mistaken impression is obtained that there is no advantage in going over 0.75% retained size, which might be attained with around 1.00% charged in a reasonably closed system. There are many mills using more rosin than this. Either rosin is being wasted or the papermaker is seeking some property which the penetration test fails to evaluate. The frequency with which practical rather than standard penetration tests are used further supports the idea that the penetration test does not tell the papermaker what he wants to know.

To thoroughly wet a sheet of paper, it is necessary to convert all of the pulp air and rosin air interface to pulp water and rosin water interfaces. There is the standard surface free energy equations:

$$PA - PW = WA \cos \theta$$
$$RW - RA = WA \cos (180 - \theta')$$

θ represents the contact angle.

where PA, PW, RW and RA represent the free energy per square centimeter of the corresponding interfaces. Since surface tension and surface free energy are numerically (though not in units) the same thing, then $WA = 72$. The literature contains contact angle measurements for alum treated rosin and alum treated pulp. Hence, 72 × the Cos of these angles gives values of $PA - PW$ or the free energy change when 1 cm² pulp air interface is converted to pulp water interface and $RW - RA$ when 1 cm² of rosin air interface is converted to rosin water interface. The ratio between these two values shows how many square centimeters of rosin surface would be necessary to completely waterproof 1 cm² of pulp surface. The literature also contains data on the specific surface of pulp and rosin dispersions so the grams of rosin necessary to waterproof a gram of a given pulp can be calculated.

This method of calculation is justified only if the rosin and pulp surfaces are so intimately mixed that it is impossible to wet the pulp surfaces without also drawing water across and wetting the rosin surfaces. The author would not be so brash as to insist that the tiny rosin particles make an acceptably intimate mixture even with the exterior of the pulp fibers. He would certainly argue that the interior surfaces of the fibers are too far removed from the rosin particles to make an acceptable intimate mixture. Therefore even if the calculations indicated that the fiber surfaces were waterproofed, one might expect that the movement of water inside the fibers would be completely unhindered.

Actually the calculation, guesstimate is a more appropriate appellation, indicated that very small amounts of rosin should completely waterproof paper. Once it is admitted that there are waterproof surfaces present, the calculation becomes too conservative, because of necessity there are new air water interfaces created inside the sheet and the energy absorbed in forming these new interfaces helps the rosin by that amount.

Again, if paper is considered as a mat of fibers, each practically parallel with the surface of the sheet, anyone capable of explaining why a needle can be floated on water, wonders how water could possibly enter a sized sheet even if it had a contact angle 40° less than some quoted in the literature.

It can be argued that pulp fibers are more like hairy caterpillars than rods and therefore, although they look like rods parallel with the surface, actually a lot of the surface (hairs) point in every direction. It can also be argued that contact angles measured on rough surfaces are meaningless, that nobody ever saw a sheet of paper waterproofed by engine sizing and that therefore the above reasoning must be erroneous. However, a few very simple experiments indicate that the reasoning is basically correct, and that some of notions regarding the wetting of paper require rather radical modification.

Effect of Air

Cellulose has a specific gravity of 1.56 and alumina and rosin are heavier than water. A sheet of paper should then sink in water unless its total bulk is over ⅓ air. Sometime hold a hard sized sheet under water just to see whether your patience of the air binding

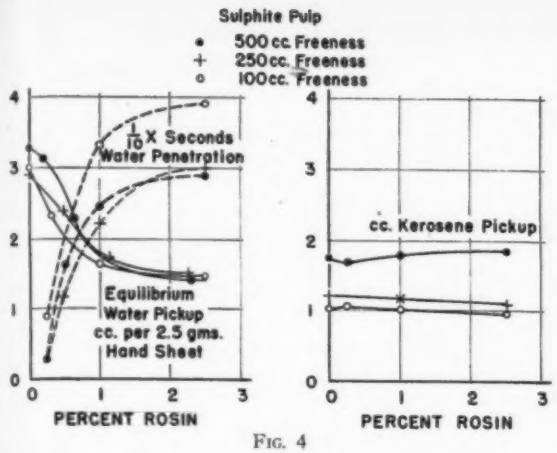

FIG. 4

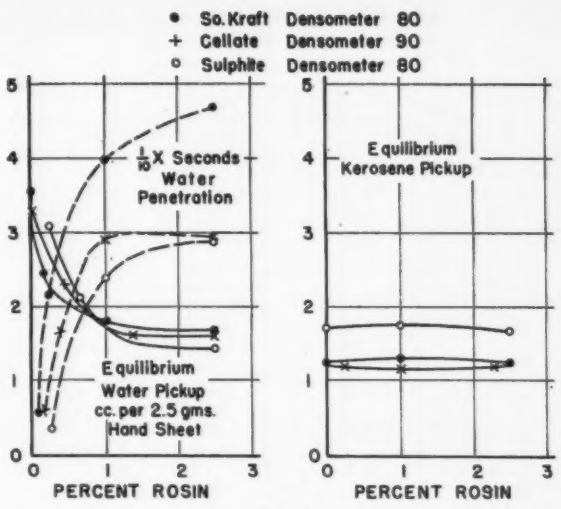

FIG. 5

capacity of the sheet gives out first. Be prepared to spend several days.

Just before you get sick of the job, put some wetting agent in the water and watch the bubbles of air slowly work out of the sheet. Obviously, part of the pulp surface is waterproof in the sense that it prefers an air to a water overcoat even when the water is under considerable pressure. The water that goes through the sheet in the water penetration test must be drawn through by nonwaterproof surfaces. Paper must then consist of a mixture of hydrophobic and hydrophilic surfaces.

Such a construction means that a wet sheet consists of fibers interspersed with bodies of air and bodies of water. That this is true on the top surface of a sheet, floating as in a penetration test, is easily shown. Float a slack-sized and a hard-sized sheet, of the same pulp, side by side. Let them float until they have come to equilibrium with the water, which can be much longer than the penetration time on the hard-sized sheet. Shake some sugar dye mixture on top of both sheets. On the slack sized sheet, the color will change immediately while on the hard sized sheet, it will take several seconds. Obviously the equilibrium ratio of wet to dry area on the two sheets varies quite markedly.

Sized sheets cannot be compared by means of a vertical climb test because no line of demarcation between wet and dry areas is noticeable in either reflected or transmitted light. On hard-sized sheets one cannot even tell which end of the strip has been submerged. The line of demarcation is absent because even after prolonged soaking the strip still consists of a mixture of pulp, air, and water whose indices of refraction are so far apart that the water cannot make the strip translucent. A wetting agent in the water can drive out some of the air but it was never possible to make a hard sized sheet pick up as much water as a soft sized sheet of the same pulp, except by long application of reduced pressure combined with the wetting agent.

An attempt was made to obtain some data on how the amount of irreplaceable air varied with the amount of size used. This was not easy so a compromise was made on finding how much water was picked up rather than how much air remained. The tests were made by submerging whole 8 × 8 handsheets for a half hour, blotting lightly, and weighing. The same kind of sheets were submerged in kerosene in the same manner. It was hoped that this would give the original volume of air in the sheet as swelling of the fibers would be at least very small. Based on linear measurements the sheets shrank very lightly.

Kerosene Impregnation

Figure 4 shows three freenesses (Canadian Standard) of a sulphite pulp. The kerosene pickups look reasonable: that is the coarser the fibers the more air in the sheet. The water pickups however, seem, within the experimental error, to be approaching some common limiting value which value has nothing to do with the original air volume as shown by the kerosene pickup. The only thing that is constant in all three freenesses is the weight of the sheets or the actual volume of cellulose. Is it possible that the limiting value being approached is the water holding capacity of the fibers themselves when their exterior surfaces are completely hydrophobic and there can therefore be no water held between the fibers?

The 250 and 500 ml freeness curves show a water pickup materially greater than the kerosene pickup. This sounds reasonable because one might expect the fibers to swell in water and thus produce more space between the fibers as well as inside the fibers. On the 500 ml. freeness curve the equilibrium water pickup is materially less than the kerosene pickup. This was not true on several other pulps at 500 ml. freeness but if these pulps were simply defibered instead of beaten one would always find the water pickup to be less than the kerosene pickup. This is just further confirmation that the water pickup is independent of the amount of space between the fibers but seems to approach some limit set by the volume of the cellulose. Figure 5 shows the same data for three different pulps all at 500 ml. freeness. Again there is the appearance of all pulps approaching a common limit.

Water Pickup

Figure 6 is the same data as Figs. 4 and 5 except now the water penetration time is plotted against the water pickup. These are all straight lines which if extrapolated and interpreted literally mean that if water pickup could be cut to zero, the water penetration test would still be finite, and not very large values at that. This is nonsense because it says that if water could not enter the sheet it would be possible, in a few seconds, get an end point indicating that water had passed completely through the sheet from bottom to top.

Possibly what it really means is that water travels through the sheet by two paths, one through the capillaries between the fibers and the other through the capil-

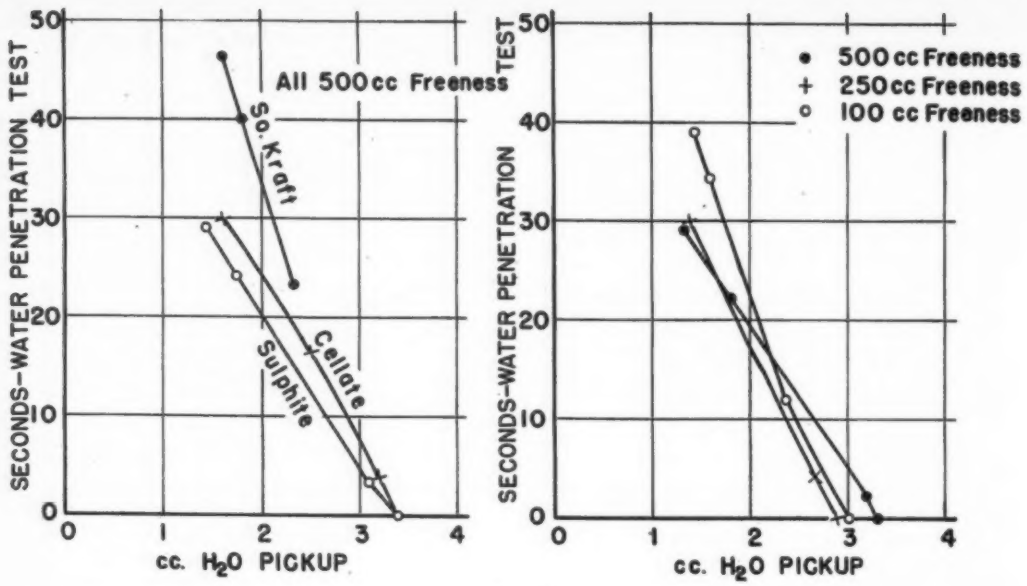

FIG. 6

laries inside the fibers. The faster path between the fibers can be blocked to varying degrees by pockets of irreplaceable air, the degree of blocking depending upon how hydrophobic the external pulp surface has been made and consequently how big the air pockets are in relation to the size of the capillaries. Seemingly they can be made nearly completely hydrophobic or approach the condition of making all the water go through the fibers. The interior of the fibers cannot be waterproofed because the size particles are too large to get in and this unsizeable inside pathway may be what sets the limit beyond which the water penetration test cannot be pushed. Aluminum ions can get inside the fibers and thus impart some water resistance to the interior.

Figure 7 shows the water and kerosene pickup and the water penetration tests on a series of sheets calendered and uncalendered. The air space has been reduced by 60% and the water penetration time increased by 35% on a sheet about half as thick. Yet the equilibrium water pickup has increased slightly due probably to rubbing off of some hydrophobic rosin particles. Apparently calendering slowed the time necessary to get water inside the fibers but seemingly had no effect on the amount taken up at equilibrium. About the same thing happened with longer beating on Fig. 6. Probably different phenomena are involved in each case. Making an explanation stick should be an interesting problem.

Figure 8 was arrived at by submerging sheets for the indicated time, blotting, and weighing. The arrows show the time necessary to arrive at the water penetration end point. In the penetration test the water was entering from one side only while in this test it was entering from both sides. That is to say that at the penetration end point, there is even less water in the sheet than these arrows indicate. Apparently the penetration end point represents different degrees of wetness on different degrees of sizing, and comes hours before the sheet has arrived at equilibrium with the water.

Wet Break Test

If the author's conclusions are correct most of what happens after the penetration end point is completed, goes on in the interior of the fibers. Wetting of the fibers should be accompanied by a softening and therefore in a decrease in fiber to fiber bond or tensile strength of the sheet. With this in mind, weights were

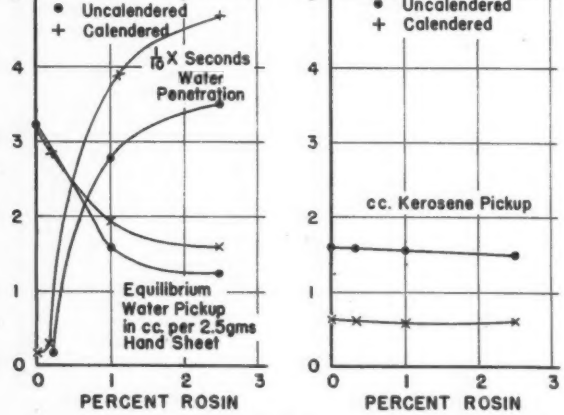

FIG. 7

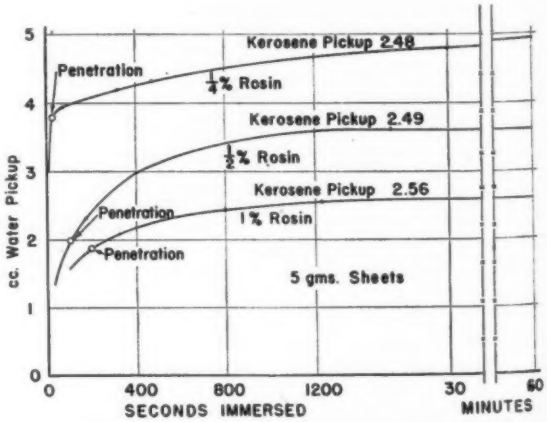

FIG. 8

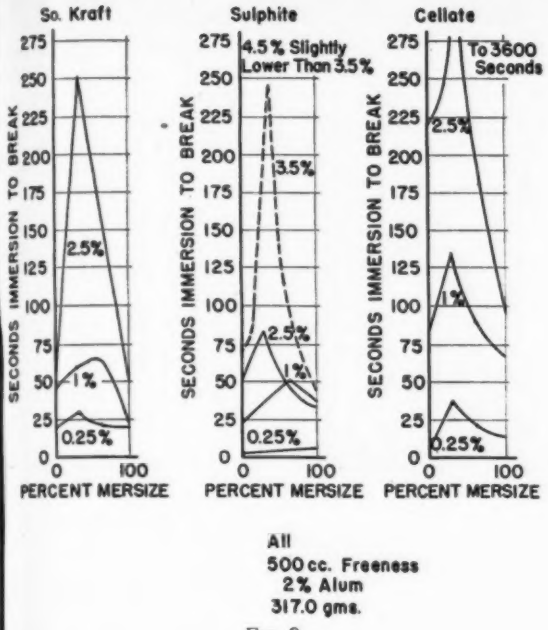

FIG. 9

attached to the ends of paper strips (1.5 c.m. wide) and were submerged, and the time necessary to soften the fibers to the point where they could no longer sustain the weight recorded. This test immediately began to show difference that were invisible to the penetration and water pickup tests. The limit beyond which more rosin was useless was greatly extended. Practically the limit seems to be set not by the amount of size but by the number of aluminum ions available. According to this test, the aluminum ion concentration becomes as important as in the ink penetration test and what might be called a temporary prolongation of dry strength is affected by all the variables that affect the aluminum ion concentration. These variables and their effects are discussed in a previous paper *(Tech. Assoc. Paper* 28: 186).

Figure 9 shows three pulps each with three different amounts of total size and each amount of total size composed of varying ratios of rosin and Mersize. This paper was started with Fig. 3 and the remark that the water penetration test always turned in the best performance for mixtures of Mersize and rosin. This test checks and accentuates this conclusion. There is no question that by this test mixtures are very much better than rosin alone. These data also check another conclusion previously arrived at, namely, that things are still happening long after the penetration test is concluded.

Figure 10 shows the same type of immersed break test. The two sets of curves are made on the same pulp but 2% alum was used on one set and 5% alum on the other. Naturally more aluminum ions can be obtained out of 5% alum than from 2%, so the fact that 3.5% total size goes twice as high with 5% alum as with two makes it likely that the extra aluminum ions are the reason. With 2% alum 4.5% total size was lower than 3.5% total size while with 5% alum even 5% total size was higher than 3.5% total size. The likely explanation is that 2% alum just does not furnish enough aluminum ions for 4.5% total size. There is also a tendency for the peaks to occur at higher ratios of Mersize to rosin on the 5% alum set than on the 2% alum set. The explanation for this is given in the next paragraphs.

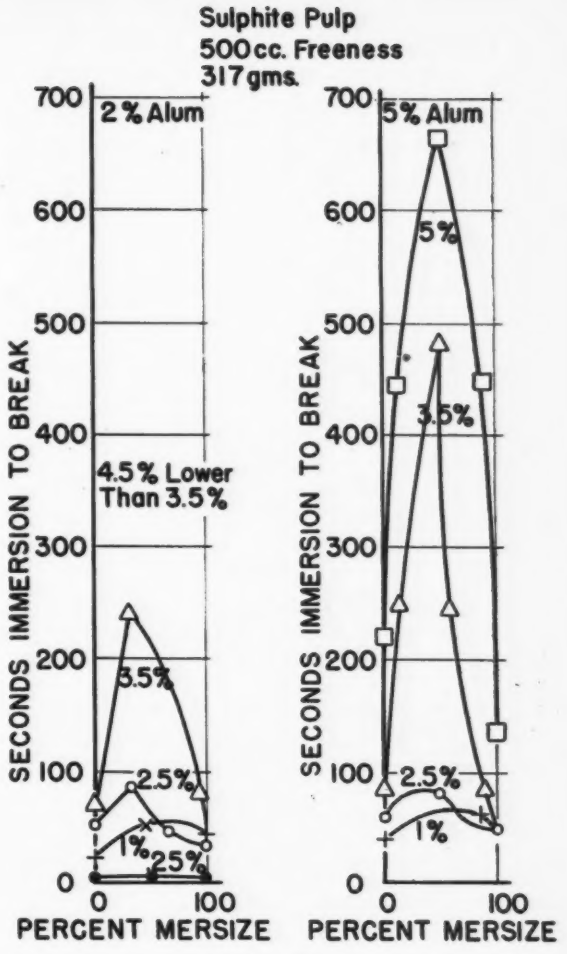

FIG. 10

Making the foregoing statements in principle rather than with figures, they are as follow. The higher the alum/size ratio, the more useful the Mersize proves to be since it has more potential bonds for aluminum ions per molecule and when dispersed more surface per unit weight. It therefore requires more aluminum ions per unit weight than does rosin. Several competent observers agree that rosin has a contact angle against water of about 60°. It cannot therefore be an efficient waterproofing agent by itself. Its real usefulness as a paper sizing agent almost certainly depends upon a surface layer of the aluminum salt of the acid. This surface layer can be regarded as adsorbed or reacted aluminum ions. These two terms probably cover the same chemical mechanism. Possibly the extra efficiency of Mersize as compared to rosin lies in this abtility to take on more aluminum ions.

No type of size can take on a sufficiency of aluminum ions if the driving force or aluminum ion concentration is too low. Because aluminum ion concentration does not increase in proportion to an increase in alum used, and because the removal of alumium ions from solutions must result in a lower final aluminum ion concentration, it follows that the use of larger and larger amounts of any kind of size must eventually defeat its own ends. It should not be forgotten that pulp also requires and uses up aluminum ions. Therefore the greater the aluminum ion demand of the pulp, the lower the optimum

amount of size that can be used. That is, one could use more size or a higher ratio of Mersize to rosin on a lightly charged rag pulp than on some of the more highly charged cruder pulps. In a previous paper, the author discussed a means of estimating the exchange capacity of pulps. *(Tech. Assoc. Papers* 27:404. (1944).

Because of the higher aluminum ion demand of Mersize its optimum dosage is materially lower than in the case of rosin. Mersize should be used alone then only in comparatively low dozages. When mixed with rosin the percentage should decrease as the total size dosage is increased, as the aluminum ion demand of the pulp itself increases and as the alum, is decreased.

Conclusion

The author suspects that, although a water penetration test is somewhat indicative of what may happen long after the end point has arrived, it is altogether too insensitive to be relied on for that purpose.

When used intelligently, Mersize is a very valuable adjunct to rosin when either ink or water resistance is desired.

As far as engine sizing goes, alum is the most important, the least understood and the most abused material used by the papermaker.

Correspondence Courses and Their Place in Vocational Education*

By J. N. Stephenson[1]

Abstract

Correspondence instruction finds its principal service and success in the field of vocational education. The author relates the history and indicates the success of the correspondence training program developed for the pulp and paper industries of United States and Canada.

President Hutchins of the University of Chicago and others prominent in public affairs have continued to stress the need for a broader study of the "Humanities" as a basis for whole and happy living. And rightly so. The need is not alone in the field of formal education, but perhaps even more so in the reading and thinking of both adults and adolescents. The liking and understanding of such non-fiction may require a revision of school curricula, possibly a partial reversion to more emphasis on some subjects that have been put on the shelf.

There is no field of education in which home-study courses may not play an important part—all the way from elementary arithmetic to graduate work for university degrees. Correspondence instruction finds its principal service and success, however, in the field of vocational education.

The concern here is with vocational education for men engaged in the manufacture and sale of pulp and paper, whether they be in the office, the laboratory, machine shop, power plant, pulp mill, or paper mill. Besides considering instruction in the technology of pulp and papermaking, the education and training of those in ancillary departments is important. The smooth and efficient functioning of manufacturing units depends as well on research, engineering, statistical and maintenance departments as on those who actually convert wood and other fiber to paper. Correspondence instruction can serve them all.

A fine example of coordination of home study with shop training was furnished during the war, when Canadian pulp and paper mills linked their machine shops to the munitions program and made over 4 million dollars worth of bits and pieces—from bolts and nuts to stern frames and gun mounts. Figuring large in this success was use of special short courses prepared by the International Correspondence Schools so that novices could study the principles of machine tools while they were doing simple jobs in the shop and preparing for advanced work. They also learned the elements of tin smithing, steam fitting, and other trades. Boiler-house men, power-house attendants, and many others, are able to advance by improving their knowledge through correspondence courses. So do bookkeepers, draftsmen, and salesmen. For years, the time-honored apprenticeship system was the only way a boy could become a proficient tradesman. Then came such a rapid development of manufacturing processes and equipment that the old timer was left on the beach while the current rushed past him.

Then came the trade school, which greatly reduced the handicap of the boy by giving him a trained teacher who could explain principles as well as demonstrate practice. But no school can operate life-size pulp and paper equipment, no matter how valuable a pilot plant may be for research or the demonstration of principles. Nor does the trade school solve the problem of the boy who is obliged to leave school and get a job—ambitious to advance, but thwarted in his opportunity for further "schooling."

For such the development of correspondence instruction has been a vertiable godsend to thousands. To T. J. Foster must go the honor of blazing the trail; in the nineties he established the International Correspondence Schools, of which J. J. Clark become dean of the faculty. The International Correspondence Schools became a great institution. Their course in papermaking then, however, comprised only a few sections or study papers.

The first university course in pulp and papermaking was established at the University of Maine in 1913, another some years later at the New York State College of Forestry, and night classes were organized in some mill towns.

Textbook Committee Formed

Realizing the need of a modern textbook explaining the processes and equipment used in Canada and the United States, the Education Committees of the Technical Section and TAPPI formed a Joint Textbook Committee in September 1918. Supported by donations

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* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.

[1] Editor, *Pulp & Paper Magazine of Canada;* Principal, The Institute of Industrial Arts; Editor, "The Manufacture of Pulp and Paper," published in 5 volumes by McGraw-Hill Book Co., New York.

from the industry in both countries totalling some $57,000, five volumes were produced. The first two comprise the fundamentals of mathematics and science; the other three cover the technology of pulp and papermaking. T. J. Foster was engaged as advisor, in view of the committee's intention to have texts suitable for home study, and J. J. Clark was engaged to prepare the manuscripts and illustrations. It was the author's job to get some forty men to write the text and about a hundred more to advise and criticize. It was 1924 before Volume V came off the press. Three years later the first revision was brought out; then in 1937-39 the second revision; now work is being done on the third — the fourth edition. The committee this year expects to celebrate its 30th anniversary by bringing out the first of the new volumes.

The figures given in the report of the Joint Textbook Committee indicate the importance of this venture. Volumes sold to January 1, 1948 totalled 46,762. All those who contributed to its success may well be proud to have had a part in it.

Correspondence Courses Established

Immediately the first book appeared—in 1922—the Canadian Pulp and Paper Association asked the publishers of the Pulp and Paper Magazine of Canada to organize correspondence courses based on these texts, and appointed a supervisory committee. The Institute of Industrial Arts was granted a charter by the Province of Quebec as a non-profit institution and fees were established on this basis. Nearly 1800 students have enrolled and many of them now hold prominent positions. A number of them have written to attest the value of their studies. At least one man went to college. The institute is no longer enrolling new students; the principal is too busy revising the textbook. Inquiries are referred to the International Correspondence Schools, Scranton, Pa.

It is believed that there will be interest in a few excerpts from letters written by former students in the correspondence courses:

Here is one from a backtender in a Canadian mill: "I do feel that in the case of a machine-tender or backtender the study of your course not only gives them useful information but it also makes them more alert and studious in respect to the work at hand and also the planning and preparing for changes, looking around for unusual trouble, improvements, etc. I was always of an inquiring nature if there was anything wrong and since studying the course I have been more so and in addition always make notes of troubles and the remedy for overcoming same, which is quite useful and good reading."

This man enrolled when a beater engineer in Pennsylvania: "When I enrolled in the course taught by the Institute I held the position of beater engineer. Since completing the course, I have been promoted to beater room supervisor and then to assistant superintendent of the paper mill. I am sure the training given by this course has helped me a great deal in my work."

The next quotation is from the first graduate, now manager of his mill: "I did not feel above completing the preliminary books even although I had just finished college, and I don't mind saying that I picked up a few tricks in arithmetic which were not taught in the school I attended. I have always felt that to complete this course added greatly to my general knowledge, and that whatever success that I have had has been partly due to the beneficial effect of this course, and I have not hesitated to recommend it to my own employees."

Number four says: "At the time of my enrollment I was laboratory tester. While studying your textbook I was also taking the I.C.S. Chemistry course, became assistant chemist, then chemist in charge, and am now groundwood superintendent."

An important aspect of vocational education is stressed in this letter: "I believe that the course offered by the Institute is excellent, and that it should be of distinct value to the industry, but this value can only be realized if the employer of a student, or a graduate, is willing to take a little interest in him, and is prepared to take advantage of the knowldege he has gained, and of the iniative he has shown. You will doubtless find it very difficult to understand that the opposite of this attitude has been so very apparent in our mill."

Unfortunately, letters from men in several other mills mention similar indifference and discouragement from "higher-ups." On the other hand, the author could quote many more letters from men whose companies appreciated initiative and rewarded it by advancing them, several to resident managerships and at least one to a vice-presidency.

The International Correspondence Schools adopted the textbook as the basis of their enlarged courses and the editor acts as their advisor on pulp and paper technology. The growing importance and recognition of the I. C. S. courses in this field—apart from the hundreds who study trade and other subjects—is shown by their growing enrollments. There were 116 in 1945; 198 in 1946, and 257 in 1947, in pulp and papermaking.

Other home-study courses in pulp and papermaking have been given by the Department of University Extension of the Massachusetts State Board of Education, and by the corresponding department of the Department of Education of Wisconsin. Massachusetts enrolled 13 students in 1947, making a total of 195.

There are several aspects of correspondence instruction that are worthy of careful consideration by any company interested in improving the quality of its personnel.

1. The man is working and earning while he studies, and vice-versa.

2. He is more interested in his work because he understands more about it—and does it better.

3. He rises to a mental level where he can "talk the same language" as the technical men he works with.

4. He is better qualified to help the research and engineering staffs improve mill techniques.

5. The man who has the ability and ambition to complete a correspondence course—if he has the personal attributes—is the kind of man who is usually able to take responsibilities. He has learned to think.

6. Class-room instruction is hampered by shift employment in the industry, by lack of trained teachers, and by the small number of men in most mills interested in a particular course. Also by the wide difference in ages and educational background.

Finally, it has been our experience that it is a good investment for a mill to give personal encouragement and financial aid—such as whole or partial refund on his course—to a man who has the sense to undertake it. Then follow it up. One can hardly pay too much for trained brains.

The Solubility of Sulphur Dioxide in Ammonia–Base Sulphite Cooking Acid*

By D. E. Marriner[1] and Roy P. Whitney[2]

Abstract

Experimental results are presented on the solubility of sulphur dioxide in ammonia-base cooking acid solutions. Sulphur dioxide pressures up to approximately one atmosphere, combined sulphur dioxide concentrations of 0.5, 1.0, 1.4, and 2.0 grams per 100 grams of water, and temperatures of 4.5, 10.0, 18.0, and 25.0° C. were investigated.

One of the interesting developments of the past few years in sulphite pulping is the use of bases other than lime in the cooking acid. Certain distinct advantages accrue from the substitution of magnesium, sodium, or ammonium hydroxide for the calcium hydroxide normally used, particularly as regards the recovery of the cooking chemicals or the production of marketable byproducts from the waste liquor.

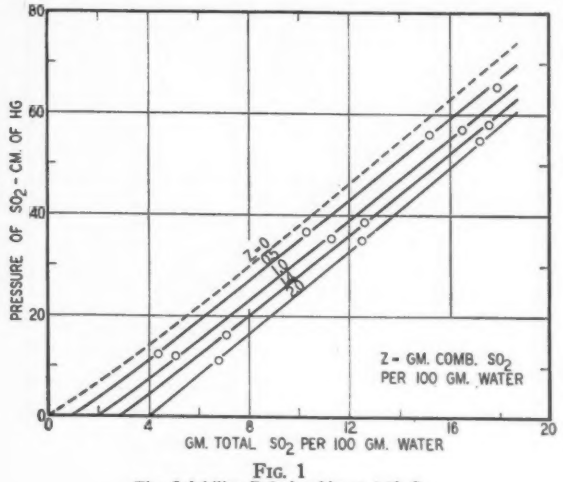

FIG. 1
The Solubility Relationship at 4.5° C.

In so far as cooking acid preparation is concerned, no serious new problems are introduced by the use of sodium or magnesium hydroxide as the base. However, since ammonia is gaseous at ordinary temperature and pressure and is relatively volatile in aqueous solution, the use of this base necessitates certain alterations in the usual techniques for acid preparation. As has been pointed out *(6)*, this operation is largely one of absorption. Hence, as with all absorption studies, a knowledge of the equilibrium solubility relationship for the system is necessary before sound considerations of absorption rate and capacity can be undertaken. As the first step in a consideration of ammonia-base cooking acid preparation, the solubility of sulphur dioxide in the solutions over the range of concentration and temperature of commercial interest, has been determined.

In so far as is known to the authors, no previous studies of this solubility relationship have been reported. Several investigators *(1, 2, 6)* have studied the lime-base system, however, and their work provides a basis for this investigation. The results of these related studies have been discussed recently *(6)*.

Experimental Procedure

The experimental technique used by White, Vivian, and Whitney *(6)* in studying the solubility relationship for the lime-base system was closely followed in this work. It consisted essentially of the bubbling of a gaseous mixture of a sulphur dioxide and nitrogen of fixed composition through an ammonia-base cooking acid solution contained in a glass cell until equilibrium between the two phases had been established. Then, by analysis of the liquor and of the exhaust gas, the solubility relationship, under the particular conditions employed, was determined.

The desired gas mixtures were prepared continuously by drawing refrigeration-grade sulphur dioxide and water-pumped nitrogen from cylinders through proportioning flow meters. The mixed gas was heated or cooled to the temperature of the experiment, saturated with water, and introduced into the equilibrium cell. Exhaust gas from the cell was discharged to the atmosphere through a water seal. The temperature-equalizing coil, the saturator, and the equilibrium cell were all immersed in a constant temperature bath, thermostatically controlled to within ± 0.05° C.

For a given run, a convenient quantity of cooking acid of predetermined combined sulphur dioxide concentration was introduced into the cell (this cooking acid had

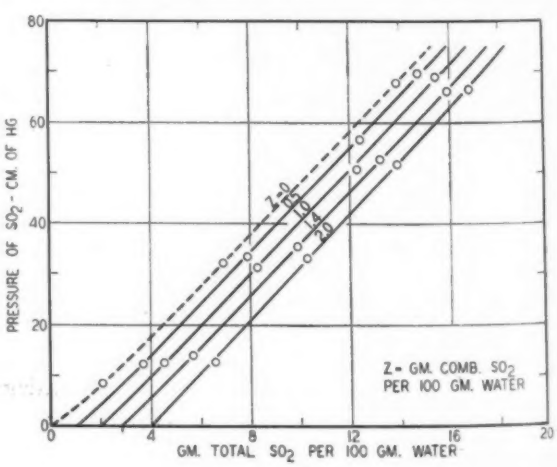

FIG. 2
The Solubility Relationship at 10° C.

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.

A portion of a thesis submitted by D. E. Marriner to the University of Maine, for the degree of Master of Science in Chemical Engineering.

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previously been prepared by absorbing sulphur dioxide in an aqueous solution of C.P. ammonium hydroxide). A gas of fixed composition was then passed through the cell for about one hour. After this period, samples of the liquor and of the effluent gas were taken in evacuated weighing bulbs and the size of the samples was determined by weight. The samples were then analyzed for total sulphur dioxide content by a modified Palmrose technique *(4)*, employing the addition of an excess of standard potassium iodate solution directly to the bulb and back-titration of the iodine liberated with sodium thiosulphate. The combined sulphur dioxide concentration of the liquor sample was also determined by the Palmrose method. The sulphur dioxide pressure over the solution in the cell was calculated from the gas analysis and the experimentally-determined total pressure, using the data of Stewart and Maass *(5)* to correct for deviations from the perfect gas laws.

Since successive samples could be taken without disturbing the equilibrium, each experiment was continued, sampling at about half-hour intervals, until the results indicated that equilibrium had been attained. For a series of runs at one temperature and one value of the combined sulphur dioxide concentration, care was observed to approach equilibrium from opposite directions in successive experiments in order to avoid possible supersaturation.

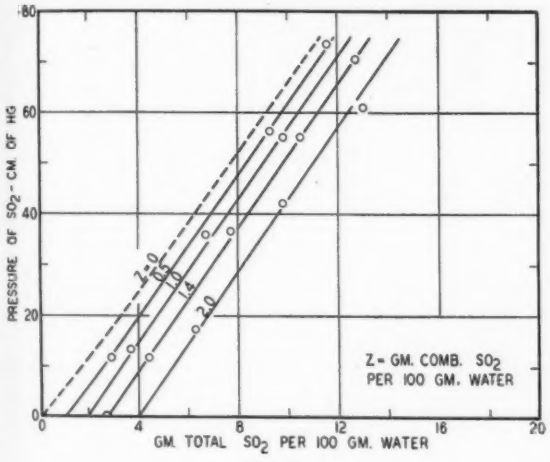

FIG. 3
The Solubility Relationship at 18° C.

To check the adequacy of the experimental procedure and the analytical techniques, three runs were conducted at 10° C. with pure water, since the solubility of sulphur dioxide in water has been accurately established.

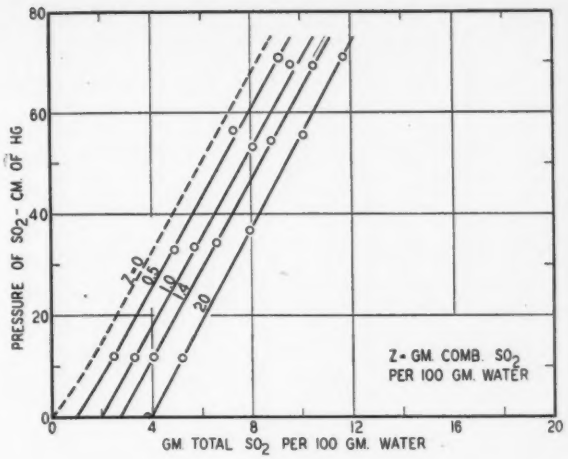

FIG. 4
The Solubility Relationship at 25° C.

Results and Discussion

The experimental results on the solubility of sulphur dioxide in the ammonia-base cooking acid solutions are presented in Table I, and in Figs. 1, 2, 3, and 4. Each of the values given in Table I is the average of at least two determinations.

Figures 1 to 4 show graphically the results obtained at the four temperatures investigated. The equilibrium pressure of sulphur dioxide has been plotted against the total sulphur dioxide content of the solution for each of the four values of the combined sulphur dioxide concentration. The dashed lines included to indicate the solubility of sulphur dioxide in water are taken from the data of Morgan and Maass *(3)*, since these are believed to be the most reliable data available. The good agreement of the experimental determinations of this investigation with the data of Morgan and Maass provides a partial demonstration of the adequacy of the techniques employed.

Comparison of the data of this investigation with the corresponding data of White, Vivian, and Whitney *(6)* on the lime-base system indicates a significant difference in the precision obtained in the two cases. Since the techniques employed were essentially the same, differ-

TABLE I.—EXPERIMENTAL RESULTS

Average Combined SO_2	4.5° C.			10.0° C.			18.0° C.			25.0° C.		
	Pressure of SO_2 [2]	Total SO_2 [1]	Combined SO_2 [1]	Pressure of SO_2 [2]	Total SO_2 [1]	Combined SO_2 [1]	Pressure of SO_2 [2]	Total SO_2 [1]	Combined SO_2 [1]	Pressure of SO_2 [2]	Total SO_2 [1]	Combined SO_2 [1]
0				8.6	2.1	...						
				32.0	6.9	...						
				67.8	13.9	...						
0.5	12.4	4.4	0.51	12.3	3.7	0.54	11.7	2.9	0.57	11.9	2.5	0.51
	36.7	10.3	0.47	33.3	7.9	0.60	56.2	9.3	0.56	32.9	4.9	0.52
	56.0	15.2	0.49	56.7	12.4	0.55	73.6	11.6	0.49	56.5	7.3	0.57
	65.5	17.9	0.50	69.6	14.7	0.56				70.6	9.2	0.58
1.0	11.9	5.1	0.97	12.5	4.6	1.01	13.2	3.7	1.00	11.6	3.3	0.90
	35.4	11.3	0.95	31.3	8.3	0.94	36.0	6.7	0.81	33.5	5.7	0.98
	56.9	16.5	0.99	50.7	12.3	1.04	55.1	9.8	1.00	53.2	8.1	1.07
				69.1	15.4	0.95				69.6	9.6	0.90
1.4	16.2	7.1	1.40	13.9	5.7	1.44	0.0	2.7	1.35	11.7	4.1	1.40
	38.8	12.6	1.50	35.5	9.9	1.44	11.5	4.4	1.35	34.3	6.6	1.36
	58.0	17.6	1.40	52.8	13.2	1.19	36.4	7.7	1.36	54.4	8.8	1.42
	68.6	20.2	1.35	66.0	15.9	1.33	55.2	10.5	1.38	69.2	10.5	1.40
							70.6	12.7	1.34			
2.0	11.7	6.8	1.93	12.9	6.6	1.97	17.5	6.2	1.93	0.0	3.8	1.95
	35.0	12.5	1.93	33.1	10.3	1.85	42.0	9.8	1.93	11.6	5.2	1.96
	54.8	17.2	1.97	51.8	13.9	2.00	61.0	13.0	2.00	36.5	7.9	1.98
				66.3	16.8	1.67				55.8	10.1	2.04
										71.0	11.7	2.04

[1] All liquid concentrations are expressed in grams of SO_2 per 100 grams of water. Mill terminology is followed in defining total SO_2 as all the SO_2 in the solution, combined SO_2 as that required to convert all the lime to $CaSO_3$, and free SO_2 as the difference between total and combined.
[2] Pressure of SO_2 in centimeters of mercury.

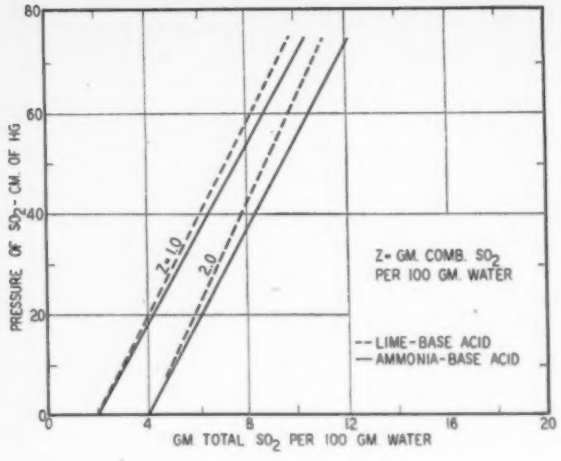

FIG. 5
Comparison of Results for Lime-Base and Ammonia-Base Acids at 25° C.

ences in the behavior of the systems are probably responsible. In the lime-base study, the combined sulphur dioxide concentration could be definitely established for a given run by controlling the quantities of calcium hydroxide and water added at the beginning. In the case of the ammonia-base system, the combined sulphur dioxide concentration could not be so controlled. When a gas mixture is bubbled through an ammonium hydroxide solution, considerable amounts of ammonia are lost by desorption until a sufficient quantity of sulphur dioxide has been added to "fix" the ammonia. It was for this reason that the runs were started with cooking acid solutions adjusted to the desired combined sulphur dioxide concentrations. These solutions proved to be unstable to a certain extent, and some difficulty was experienced in maintaining the proper combined sulphur dioxide concentrations during the runs, as is evident from the data. A detailed study of the reasons for this difficulty was beyond the scope of this investigation.

Some improvement in the apparent precision of the plotted data can be realized by interpolative correction of the combined sulphur dioxide concentrations to the desired values. It was considered preferable, however, to present the data as they were experimentally determined. They are sufficiently precise to define the solubility relationship satisfactorily for absorption studies.

Examination of Figs. 1 to 4 shows that the equilibrium pressure of sulphur dioxide is almost a linear function of the liquid concentration. Some curvature of most of the lines of constant combined sulphur dioxide concentration is indicated, particularly at the lower combined values, but the effect is not pronounced. As with the lime-base system, the parameters appear to approach a value of twice the combined sulphur dioxide concentration at the abscissa, indicating that Henry's law holds approximately for the "true free" sulphur dioxide in the solution.

The results of this study are compared directly with those obtained by the same technique on the lime-base system *(6)* in Fig 5, at a temperature of 25° C. and combined sulphur dioxide concentrations of 1 and 2 grams per 100 grams of water. The ammonia-base acid shows a somewhat higher liquid concentration at any given equilibrium pressure than does the lime-base acid. The explanation for this phenomenon may lie in a different degree of ionization of the ammonium and calcium bisulphites.

Acknowledgment

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Standard Terms Relating to Tall Oil*

TAPPI Tentative Standard O 405 p-48

The standard terms for tall oil here given have been established by general usage. To avoid confusion, they have been brought into conformity with those of the American Society for Testing Materials in its standard D 804-44T.

No attempt has been made to define 'crude'" and "refined" tall oil, because the degree and nature of refining operations vary so widely. Although definite chemical and physical specifications are commonly employed, the wide gradation in the various tall oils used in diversified applications makes it inadvisable at present to attempt to define classes or grades of tall oil.

1. *Tall Oil.* The natural mixture of rosin acids related to abietic acid, and of fatty acids related to oleic acid, together with nonacidic bodies, which is the product of the acidification of the skimmings from the black liquor of the alkaline paper pulp industry.

NOTE: The following designations for tall oil shall be considered obsolete.

Crude resinous liquid	Resin oil	Swedish rosin
Finn oil	Sulphate pitch	Swedish resin oil
Lignin liquor	Sulphate resin	Swedish rosin oil
Liquid resin	Sulphate rosin	Sylvic oil
Liquid rosin	Swedish pine oil	Talloel
Pine wood pitch	Swedish resin	Tallol

2. *Tall Oil Abietic Acid.* The crystalline or solid product, consisting principally of rosin acids, separated by crystallization from tall oil.

3. *Tall Oil Pitch.* The undistilled residue from the distillation of tall oil.

4. *Tall Oil Rosin Acids.* The organic acids in tall oil that respond to the Lieberman-Storch test for rosin and that remain unesterified after the application of the Wolff method or similar esterification procedures. The molecular weight of these acids shall be considered to be 302.

5. *Tall Oil Skimmings.* The curd, not acidified or otherwise processed, skimmed from the black liquor of the alkaline paper pulp industry.

6. *Tall Oil Soap.* The product formed by the saponification or neutralization of tall oil with organic or inorganic bases.

* This recommended practice has been recommended as a tentative standard by the Chemical Products Committee. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York 17, N. Y.